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## A CENTURY IN RETROSPECT

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THE MEDICAL SOCIETY of Nova Scotia, a branch of The Canadian Medical Association, is celebrating its One Hundredth Anniversary in October. It came into being in the same year that saw Britain and her Allies engaged in the Crimean War. The preceding dozen years had seen a tremendous industrial and social upheaval in Britain. Railways penetrated to every part of the country. Wages and conditions of labour were critically reviewed and marked reforms effected. The steam engine had come into its own and had created new problems of importing raw materials for manufacture and marketing the finished product. As never before the Motherland began to look to her Colonial possessions as sources of economic advantage. The Great Exhibition of London in 1851 gave point to a decade of outstanding achievement. The building of an Empire was underway and the world was aware of it. In 1848 Karl Marx told the proletariat it had "Nothing to lose but its chains" and Dr. James Y. Simpson in Edinburgh told the world that pain was forever banished from midwifery and from surgery. Both announcements were to profoundly stir society in the succeeding hundred years, though in different ways.

Nova Scotia, closely connected with all that went on in Britain since the founding of Halifax in 1749, was feeling the impulse to progress as never before. In this she was sustained by a consciousness of her own achievements. With almost a century of Government by an elected Assembly, the decisive triumph of the Assembly in its struggle for supremacy with the Legislative Council, and a free press championed by Joseph Howe, gave grounds for confidence. Trade with Britain was good and would soon be better. Shipbuilding was a direct result of this and the great wind ships of Nova Scotia sailed the seven

seas. Writers, like Haliburton, had won a place in literature, and Gesner and Dawson had made her known in the world of science. A few weeks after Simpson published his procedure for the preparation of chloroform, James D. B. Fraser, a druggist in Pictou prepared it, had it used on his own wife in her confinement, and sent a quantity to Halifax where it was first used in the Poor Asylum for the amputation of an old lady's thumb. Travel by road and by water was improving, and railways were promised. It was time for any persons with a common interest to meet for an exchange of views.

By 1853, after some seven years of organization within the limits of the County of Halifax had indicated the benefits of a larger effort, the Medical Society of Nova Scotia came into being. Its objectives were as follows:

1. To effect a union of all qualified physicians in the Province.
2. To secure legislation covering the organization and activities of such a group.
3. To secure just remuneration for public services performed by members of the profession.
4. To prevent illegal practice and practice by unqualified persons.
5. To publish an annual register of qualified physicians.
6. To hold monthly meetings for scientific discussion and the promotion of other aims of the Society and in particular harmony and good feeling among its members.
7. To hold an annual meeting in Halifax.

A mere recital of its doings in achieving these objectives or attempting to do so, appears less valuable on an occasion like this, than selecting somewhat at random a few outstanding incidents, representative personalities and noteworthy lessons learned.

In Nova Scotia in 1853 physicians were essentially individualistic in outlook. Excepting Halifax there were no groups of any size. Their educational background varied. Some had gradu-

ated from schools in the United States, like Harvard and the University of Pennsylvania. Others, and the majority, were from British schools of medicine, while a few had followed a system of apprenticeship under a well recognized physician, followed by one or two years in a school of medicine to secure a degree. Compared with today, medical progress was at a snail's pace. There was no medical school in the Province to stimulate a desire to keep "up-to-date". Medical journals were few. The Pharmacopœia had changed little in the preceding half century. Surgery was still a heroic measure. Obstetrics had gone as far as it could without the aid of the great discoveries of the next fifty years. It was not a matter of wonder, therefore, that a graduate in medicine, say in 1845, could feel that isolation from his fellows and with only occasional references to his textbooks placed him at no professional disadvantage. In Nova Scotia, and for that matter in the world at large, chloroform changed all that. It is true that ether had preceded it, but chloroform was easier to give, more rapid in its effects and was sponsored by a university in the old land greatly admired in Nova Scotia. But simple as the technique of administration, it had to be learned. Its use led to an increase in surgical procedures, previously avoided because of pain. The doctor in Nova Scotia found himself of necessity, a student again, and, both in learning and in doing, to closely associate with his fellow practitioners.

In still another field medical men were facing a challenge. Epidemics of one sort or another inspired terror in the minds of the public. Sea-ports, like Halifax, were exposed to yellow fever, Asiatic cholera, bubonic plague and small-pox carried by vessels from infected ports. The increase of shipping made it a province-wide interest. Civic administration was asking medical men to give leadership in preventing and fighting these dangers. It is unfair, perhaps, to state that the advice given was not particularly effective in the light of present knowledge. On one occasion when Halifax was threatened, the profession advised the burning of sulphur in pots at different points throughout the city daily. Perhaps the fumes and the fact that something was being done created an increase in morale of high value on such occasions.

A point worthy of special emphasis is that from the beginning, and up to the present, membership in the Society was a voluntary act and

in no way a pre-requisite to the right to practice. For this reason every physician who joined had an interest, small or great, in what the organization stood for. They thus developed a group consciousness. Should a half dozen urge some project in the public interest, they felt they were not only acting on their own behalf but enhancing the reputation for public service held by the profession at large. When, therefore, the medical men of Halifax urged reform, the Society felt a duty to support them and a sense of achievement if they carried their crusade to a successful conclusion.

In 1853 there was not a single hospital worthy of the name in Nova Scotia, except those maintained to care for the sick of Her Majesty's Forces. In Halifax an institution known as the Bridewell served as a poor house, a house of correction for petty offenders and hospital. Conditions there rivalled those described by Dickens in the Fleet Prison in London. Since the poor and criminal elements were drawn from all parts of Nova Scotia, the state of affairs was known and tolerated both by the City and Provincial Governments. Sponsored by members of the Medical Society, a new campaign for a hospital began in Halifax. Fear of a plague of cholera stimulated interest and in 1858, five years after the Society came into being, a hospital situated on the South Common, some 300 yards from the nearest dwelling, was opened in the "Capital City". Even earlier, a visit by Dorothea Dix to the Province and the halls of its legislature had resulted in the construction of a hospital for the insane, Mount Hope, on the opposite side of the Harbour. To this effort the public gave more enthusiastic support than to a public general hospital, a fact which surprises us today until we remember that in those days general hospitals were only for the poor, the well-to-do sick being cared for at home. Insanity, however, created circumstances beyond the resources of a home, rich or poor, to control.

In 1868, fifteen years after the Society was organized, Dalhousie College opened a School of Medicine. Joint participation in the operation of the public hospital in Halifax was assumed by City and Provincial Governments and, as the "Provincial and City Hospital", it was the centre of clinical teaching for the new school. Every physician in Nova Scotia could and did send patients to this hospital and looked upon it and the medical school as a centre of help and in-



spiration. After a period of five years rising costs made the College relinquish the teaching of medicine. It was then that Halifax medical men, supported and encouraged by their confrères throughout Nova Scotia, founded the Halifax Medical College which, in affiliation with Dalhousie, carried on the teaching of medicine until 1911 when it was once more assumed by the University. Then from 1873 until 1911 this group of devoted practitioners fought the problems of finance and teaching as well as of making a living in the "horse and buggy days". For nearly all that period the great bulk of their hospital practice was carried *in gratis*. More than once, when the annual meeting of the College showed a deficit, the faculty dug down in its pockets and made up the difference. When the hospital directors appointed a physician on the basis of influence rather than merit the entire staff, which was also the faculty of the Medical School, resigned in a body. A public inquiry and investigation led to the correction of many wrongs and the assumption of ownership of the hospital by the Province, which became, in 1887, the Victoria General Hospital and remains one of the great hospitals of Canada today.

In 1872 it became apparent that standards of education and licensure of physicians, as well as disciplinary action on them, was best carried on by a small group of doctors representing the Society and the public interest as vested in the Government. As a result the Provincial Medical Board was created. From that date the Board and Society have carried on their independent functions.

In a century so many members of the Society have won a place in Canadian Medicine that any selection is open to criticism. As examples of what a Society would like to consider its best, we may briefly refer to two doctors: Dr. John Stewart of Pictou, later of Halifax, and Dr. William Scott Muir of Truro. The first represents the surgeon specialist; the second the general practitioner. The career of John Stewart is too well known to repeat at length. A son of Nova Scotia, he was Lister's house surgeon at the Edinburgh Infirmary and one of the little group that went to London to spread the gospel of antiseptic surgery. With an outstanding career as a surgeon in England within his grasp, he chose rather to return and give his talents to his native Province. He became honoured as no other doctor has been honoured in Nova Scotia.

To the public he was the skilful and beloved surgeon; to the profession he represented the acme of self sacrificing achievement and ethical conduct. During World War I, when an elderly man, he led the Dalhousie Hospital Unit overseas. As Dean of the Dalhousie School of Medicine and President of the Provincial Medical Board, he exerted an influence on the profession which is felt even to this day. He was a President of the Canadian Medical Association and delivered the first Listerian Oration.

William S. Muir was a general practitioner in Truro. In this capacity he represented all that the public and profession demand—kindness, skill, tireless energy and devotion to his patients. In an equal measure he was devoted to the welfare of his profession. In his day he was known from one side of Canada to the other and, had he lived, he would have held place with this Nation's great. When he died he was Secretary-Treasurer of the Medical Society of Nova Scotia and the President of the Maritime Medical Association. A writer of the time recorded that with certain death at hand, many of his last precious hours were devoted to the work of the Society. After his death in 1902 a subscription list was circulated with one dollar limit to erect a public monument to his memory, but so great was the response that, instead of a pillar of stone, the fund provided a nucleus for the construction of the Colchester County Hospital, a splendid institution and a fitting memorial indeed.

With a background of men and their achievements such as this, it is worthwhile to see if the tradition has been maintained. In 1921 when the Canadian Medical Association stood with its "back to the wall" and dissolution appeared imminent, its Annual Meeting was held in Halifax. It was then that the spirit of seventy years of struggle and achievement came to the fore among the Nova Scotia members. They had shared in the founding of the C.M.A., they were not going to strike colours without a struggle. They would do their part and more if other provincial societies would do the same. As a result the Association regained life and such vigour and strength that it has carried on to the present day increasing its work and influence each year.

Medicine in Nova Scotia has never been backward in promoting and urging all measures calculated to raise standards of public health and welfare. It sponsored, with a financial shoe-

string to sustain it, Maritime Medical Care Incorporated, a scheme of non-profit prepayment medical care which has firmly established itself in public estimation and generally in that of the medical profession of the Province. It has never lost sight of the interests of the citizens in economic matters as well as in curative procedures. As a result the general reaction of the public to the medical profession in Nova Scotia is one of approval. From time to time incidents of professional devotion and selfless acts which become known indicate that the spirit of the Hippocratic Oath is not dead.

If the records of a century of Nova Scotia medicine mean anything and can teach anything to the rest of Canada, we believe it may be summarized briefly as follows:

1. That organization based on interest in raising and maintaining professional standards for the welfare of the public is worthy and laudable.

2. That the best organization is composed of physicians who freely choose to devote their time, energy and interest to its objectives. In this way dictatorships within the profession are dis-

couraged, and a drop in membership is a clear indication of disapproval which must be heeded.

3. That any organization must demonstrate an active and lively concern for the public interest and, if even to its own immediate detriment, insist on the promotion of what it believes to be right and good.

4. That no organization is better than the men who compose it and they should, as individuals, study the welfare of their patients before their own.

5. That a profession acting in this manner is respected and honoured by the public at large.

6. That in order to act in this fashion the public must insist on freedom and not enslavement of the medical profession to the end that consequent self-respect will never fail to demonstrate itself in an energetic exhibition of public responsibility.

Firm in these ideals and in thankfulness for the past achievements of a worthy ancestry the medical profession in Nova Scotia hopefully faces the future.

### THE DANGEROUS "UNIVERSAL DONOR": A CASE OF HÆMOGLOBINURIC NEPHROSIS

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WHILE GROUP O plasma normally contains anti-A, and anti-B isoagglutinins, it is still not generally appreciated that 23%<sup>1</sup> or more of "universal donor" bloods have a relatively high antibody titre.<sup>1, 2</sup> Of equal significance, not only may the anti-A or anti-B titre of Group O blood be elevated, but the agglutinin may be of the immune type, rendering such "universal donor" blood especially dangerous to recipients of the other major Landsteiner groups.<sup>3</sup>

The following case report concerns a group A patient who, received such unmatched group O blood, suffering a severe hæmolytic transfusion reaction thereafter, and rapidly developing acute renal failure or "lower nephron nephrosis".

Mrs. F.S., age 67 years, diagnosis carcinoma of vulva, was matched the day before operation and found to be group A, Rh<sub>0</sub> positive (A<sub>1</sub>, Rh<sub>0</sub> positive, N). During the operation on July 29, 1952, she received 500 cc. of matched group A, Rh<sub>0</sub> positive blood, but as no further matched group A was immediately available, and as there had been more extensive hæmorrhage than anticipated, she was given two bottles of unmatched group O, Rh<sub>0</sub> positive "bank blood". Despite these two 500 c.c. transfusions her general condition continued to deteriorate, and when she was returned to the ward it was found that a catheter specimen was dark red in colour and this was found to be due to the presence of hæmolyzed blood.

All three transfusions had been given in the operating room while the patient was under general anaesthesia, and this undoubtedly masked the first stage of "reaction shock" that one normally associates with a hæmolytic transfusion reaction. On re-testing the residual blood in the three bottles, it was confirmed that the one group A was compatible with the pre-transfusion specimen of the patient's blood; and that one of the group O's had a normal range titre (saline) of 1:16, whereas the other group O reacted strongly, the anti-A titre (saline) being 1:256, weak 1:512.

The patient received the type of conservative treatment and dietary regimen advocated by Bull *et al.*<sup>4</sup> Her postoperative condition, despite a marked oliguria and rising N.P.N., appeared to be reasonably good for the next 8 days, but she died suddenly on the 9th postoperative day.

In the meantime, further studies were completed on the higher titre group O donor blood



and on the patient's post-transfusion blood specimens. A review of this donor's past history was most rewarding. On March 17, 1952 he had been inoculated with T.A.B.T.D., *i.e.* four months before his blood donation. Seven days after donating, he again received a T.A.B.T.D. inoculation. We were able to obtain another specimen from him 14 days thereafter. On this occasion the donor's serum showed a marked rise in anti-A to a titre of 1:8,000, (saline) and the antibody had certain immune characteristics. The anti-B titre on the other hand, remained at the low level of 1:8.

The patient's post-transfusion specimen on the second postoperative day gave a strongly positive direct Coombs reaction (direct anti-human globulin test). A further specimen of the patient's blood on the fifth postoperative day also resulted

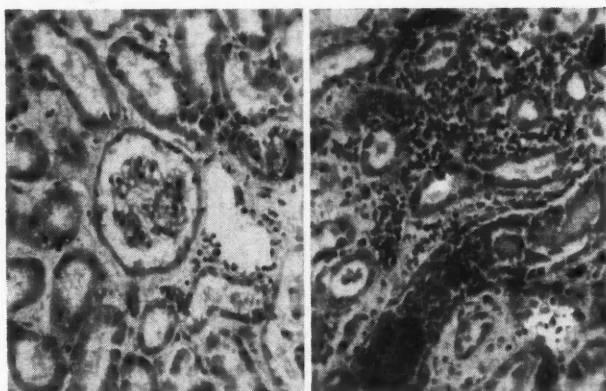


Fig. 1

Fig. 2

Fig. 1.—The glomerulus is bloodless. Debris is present in the capsular space. There is tubular degeneration and interstitial oedema. (X 450). Fig. 2.—A collecting tubule containing a cast. There is a granulomatous reaction in the interstitial tissue. (X 450).

in a positive direct Coombs test with her thrice-washed cells, the reaction being quite definite although appearing less intense than on the previous test.

We were thus reasonably sure that the recipient's cells and conceivably the group A Rh<sub>0</sub> positive transfused cells from the first bottle had become "coated" with an immune antibody, the probability being that an immune anti-A was responsible. There was no indication in the recipient's serum of any of the commoner Rh immune agglutinins.

A differential agglutination test on Mrs. F.S.'s specimen (fourth postoperative day) using potent anti-A testing serum, indicated that the transfused O Rh positive cells had survived, (approx. 660,000 per c.mm.), it being logical to expect

this result, since the hæmolyzing effect of the potent anti-A containing group O donor blood would hæmolyze only group A cells. The two bottles of unmatched group O blood each contained 380 c.c. whole blood and 120 c.c. anti-coagulant, it being estimated from the residue remaining in the bottles that the patient received some 650 c.c. whole blood of group O, of which approximately half contained the high titre anti-A isoagglutinin and isohæmolysin.

#### AUTOPSY FINDINGS

**Gross examination.**—A complete autopsy was performed 22 hours after death. The important findings are summarized as follows: There was slight puffiness of the face and slight oedema of the ankles. The operative wound was clean and dry. The left lung weighed 550 gm. and the right lung weighed 600 gm. There was no embolic material in the pulmonary arteries. Each lung was very wet and very congested. The heart was moderately enlarged and weighed 400 gm. No other cardiac abnormality was present. The coronary arteries showed only minimal arteriosclerosis. There was no free fluid in the thorax or abdomen. Except for the kidneys the abdominal organs were grossly not remarkable. The kidneys were larger than normal. They were pale-grey, equal in size and together weighed 460 gm.

Incision of each kidney revealed a similar picture. The cortex was very pale and abnormally wide. The medullary rays were dark-red. The differentiation between cortex and medulla was therefore quite striking. The renal pelves, and ureters were not remarkable. The bladder contained a small amount of thin yellow urine.

**Microscopic studies.**—The kidney sections showed the picture of hæmoglobinuric nephrosis. Nearly all the glomeruli were bloodless. In some of their capsular spaces eosinophilic debris was present. The renal tubular epithelium showed marked degenerative changes. Primarily the epithelium of the lower nephron was affected (Fig. 1). Many convoluted tubules contained eosinophilic debris. Many collecting tubules contained hyaline and granular casts (Fig. 2). The interstitial tissue was oedematous and infiltrated focally with lymphocytes and plasma cells. There was marked dilatation of interstitial venules and capillaries and some of these had ruptured into convoluted tubules.

The lung sections showed extensive pulmonary oedema.

The cause of death was determined to be hæmoglobinuric nephrosis due to incompatible blood transfusion with terminal acute cardiac failure.

#### DISCUSSION

Mollison has reported on a case of a severe hæmolytic reaction in a group A patient who received group O blood, with the very interesting finding that the donor had received anti-tetanus serum 38 days before giving the blood donation.<sup>5</sup>

There is some evidence that T.A.B. and other commonly administered prophylactic vaccines can cause a non-specific increase in the indi-



vidual's isoagglutinin(s), as we have found in this case.

Ervin and Young<sup>3</sup> (1950) have indicated that the "immune" anti-A antibody may be largely responsible for the serious transfusion reaction in group A patients, and it is suggested by them that group specific substances A and B may not always render stored "universal donor" blood absolutely safe for patients of other groups.

In civilian practice emergency group O transfusions to recipients of other groups should thus be given with caution, and when possible it is advisable to check the anti-A titre at least, before issuing group O Rh positive or negative blood from the laboratory for urgent cases.

In the presence of an immune anti-A, the ability of this antibody to agglutinate group A cells is often enhanced by using normal group AB serum; whereas with naturally occurring anti-A and anti-B the agglutination of the appropriate A or B cells is not intensified by performing titrations in serum rather than saline.

Although the clinician may seldom encounter a severe hæmolytic reaction of this nature, the large-scale use of so-called "universal donor" blood in forward hospital areas under wartime conditions is fraught with this potential danger, and if servicemen and civilians should receive protective inoculations of T.A.B.T.D., anti-tetanus serum, etc., they may be stimulated to produce for example, an immune anti-A and a hæmolysin that could be disastrous if their blood should be subsequently administered as "Group O unmatched" to patients of other groups, such as A or AB.

The possibility of iso-antibody stimulation in this way deserves further study since it may occur more frequently than one realizes, depending on the facility with which the person becomes sensitized; the time of the blood donation after the prophylactic immunization; and the number and volume of the inoculations of T.A.B.T.D., etc. Certainly all high titre "Universal donor" bloods that may contain an "immune" isoagglutinin should be reserved for matching with group O recipients only, the exact "critical titre" depending on the particular methods and techniques employed in individual laboratories.

Fortunately, among civilian donors, group O plasma rarely contains potent isohæmolysins, and

clinically recognizable hæmolytic reactions from group O blood are rare.<sup>5</sup>

#### SUMMARY

A brief description of a severe hæmolytic reaction in a group A patient who received unmatched group O blood is presented.

There is some evidence that this so-called "Universal donor" was stimulated to produce an immune anti-A by inoculation with T.A.B.T.D., and that this donor plasma was strongly hæmolytic to the recipient's red cells.

It is recommended that any group O donor blood to be administered as an emergency measure to recipients of other or unknown groups should, whenever possible, be "screened" by testing at least the anti-A titre in saline and normal AB serum. The latter medium will often enhance the capacity of an "immune" anti-A to agglutinate group A cells.

#### REFERENCES

1. TISDALL, L. H., GARLAND, D. M., SZANTO, P. B., HAND, A. M. AND BONNETT, J.: *Am. J. Clin. Path.*, 16: 193, 1946.
2. United States Federal Civil Defence Administration Technical Manual: April, 1952, TM-11-5, p. 15.
3. ERVIN, D. M. AND YOUNG, L. E.: *Blood*, 5: 61, 1950.
4. BULL, G. M., JOEKES, A. M. AND LOWE, K. G.: *Lancet*, 2: 229, 1949.
5. BALGAIRIES, E. AND CHRISTIAENS, L.: *C. R. Soc. Biol.*, 126: 31, 1937.

Very great improvements in treatment of disease have resulted from new drugs produced in ever-increasing numbers as a result of advances in chemical industrial technique, but it is not always well recognized that this very advantage carries with it inherent and unforeseen dangers. In no field of therapeutics is this danger more menacing than in that concerned with the use of sedative and hypnotic drugs. Formerly the physician could rely on paraldehyde, bromides, chloral hydrate, barbitone and phenobarbitone: now, however, he finds himself confronted with a number of barbiturates and mixtures of barbiturates with analgesics, and, further to confound confusion, the same drug may appear under a variety of proprietary names. The British Pharmacopœia is wont to give a proprietary remedy an approved name and later to change it completely when the substance is granted the precarious sanctuary of its austere pages. Even the expert may be hard put to it to identify a well-known substance when it appears under a strange soubriquet.—Thomas N. Morgan, *The Practitioner*, 171: 196, 1953.

## ATHEROSCLEROSIS— INEVITABLE OR CONTROLLABLE?

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THE PATHOLOGISTS who first studied arteries under the microscope concluded that lipid and chalk occurred in degenerating tissue, and most clinicians accepted the idea that hardening of arteries was as natural and inevitable as the ripening and rotting of fruit. The view that lipid is deposited only after degeneration has occurred still finds champions among the histologists who study human vessels with special stains for calcium or mucoprotein, but has been discarded by those who study experimental atheromas, which are easily produced in the healthy vessels of young rabbits, chickens or dogs. For if the experiment is stopped and the lipid is re-absorbed, they see the same thickened intima, with chalk and mucoprotein, which their colleagues have chosen to regard as initial, rather than healed or inactive lesions.<sup>1</sup>

Prior to 1914, no one suggested that atherosclerosis might be due to anything as simple as deposition of cholesterol from a plasma overly rich in material absorbed from the diet. Anitschow's report, from Russia, of experimental production of lesions by feeding rabbits cholesterol was lost in the thunder of the guns in the woods of Tannenberg, but after 1920 was repeated and soon confirmed in Germany and in Boston.<sup>2</sup> Now it is almost universally believed that the vascular lesions are secondary to deposition of cholesterol which formed part of the plasma colloids, and the argument centres on the mechanism involved. Why are certain sites favoured? Other things being equal, does the rate depend on the level of total cholesterol, or of some specific fraction? Is the deposited cholesterol formed by the body in maintaining plasma cholesterol levels, or is it cholesterol absorbed from the intestine? The practical problem, how may atherosclerosis be retarded or stopped, will be solved only when we can confidently answer these basic questions.

Experiments on chicks, dogs, and rabbits confirm the finding in man that atherosclerosis evolves more rapidly in hypertensive subjects

than in controls. In man it forms faster in regions where pressure is elevated, such as the abdominal aorta, the iliac and tibial arteries. The pulmonary artery is spared except in those with pulmonic hypertension. However, the problem is not just one of rapid percolation of plasma due to high pressure, for atherosclerosis often is far more advanced in the coronary arteries than elsewhere, and when the thoracic aorta is injured by syphilis, atheromas form more rapidly in the thickened intima of the thoracic part than in the abdominal part of the aorta. Thickening of the coronary intima is an anatomic feature in many species of mammal and bird even in early life, and the studies of Wilens<sup>3</sup> show that the intima and media of arteries not only are less permeable to fluid and to plasma colloids than the veins, but that even *in vitro* they accumulate substances like Evans Blue dye which has been adsorbed on the serum albumen, or the cholesterol which travels with the globulins. These pass through the veins leaving no trace, but only a fraction of cholesterol or globulin comes through in the arterial wall filtrates, and the intima and media of the artery remain visibly impregnated with lipoprotein. Apparently the tissue of the intima plays an active part in converting colloidal cholesterol into visible microscopic droplets. Wilens also has shown the effects of pressure in predisposing to cerebral vascular deposition of cholesterol in those with long spinal columns. Thus, much has been learned about the preferential location of atheromas, due to anatomic and physical causes, and it all fits into the theory of deposition from the plasma.

If cholesterol were deposited like the mud in the delta of a river, we would expect the rate of formation to vary directly with the level of plasma cholesterol. This proved to be true, in animal experiments, but is not simple even there. In all species, rates vary with blood level, but in dogs no deposition becomes apparent at plasma levels below 400 mgm. %, while in rabbits it becomes apparent at 100 mgm. %, and in man at 180 mgm. %. The ratio of cholesterol to phospholipid at which atheromas appear is about the same in all three species, so that the cholesterol-phospholipid ratio seems more important than the absolute cholesterol values.

There is a very great difference in blood cholesterol between natives of regions where atherosclerosis is rare and those where it is fre-

\*The Dobbie Memorial Lecture, Academy of Medicine, Ottawa, March 6, 1953.

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quent. Thus, total plasma cholesterol averages under 70 mgm. % in Tamils in India, under 150 mgm. % in Malaysians and the people of North China, and over 200 mgm. % in the people of North America.<sup>4, 5</sup> But among the latter, there is only about 10% difference in total cholesterol between those who have experienced coronary occlusion and a control group free of demonstrable atherosclerosis. Of course these controls actually are developing atheromatous plaques, which are demonstrable in nearly 90% of North Americans who die after the age of 50. At any event, the use of total blood cholesterol, or even of cholesterol-phospholipid ratios appears to be of limited value in selecting those in whom atherosclerosis is developing rapidly, or in determining effects of diet on human atherosclerosis.

Cholesterol occurs in the plasma adsorbed or chemically bound to globulins, and the various molecular species of lipoprotein all contain phospholipids, and both esterified and free cholesterol. Alpha globulins contain about one-fifth the cholesterol, together with twice its weight of phospholipid; bound to beta globulin are nearly three-quarters of the total cholesterol with 80% of its weight of phospholipid. In atherosclerotic young men and in animals fed cholesterol, the rise in plasma levels affects the beta-globulin, phosphorus-poor cholesterol compounds,<sup>6</sup> but in patients with chronic biliary obstruction, rabbits with alloxan diabetes, and rabbits given detergents such as Tween 80 by vein, the very great rise (up to 2,000 mgm. %) in cholesterol affects chiefly the phosphorus-rich alpha globulin-bound molecules. In all three of these latter situations no atheromas form, although plasma cholesterol remains high for months or years.<sup>7</sup>

Gofman and his colleagues have found another way to measure the atherogenic fraction of the cholesterol in the plasma, by use of the ultracentrifuge.<sup>8</sup> This shows that the rise in cholesterol in alloxan diabetic rabbits and jaundiced men involves molecules with a specific gravity over 1.07 or less than 0.96. In young men with coronary disease, or rabbits fed cholesterol, there is an increase in cholesterol in molecules with a specific gravity between 1.022 and 0.98. Under the conditions used in the Donner Laboratory, these molecules have a Svedberg flotation value of 12 to 20 (Sf 12 to 20), and in normal rabbits or young people the cholesterol in this fraction is less than 20 mgm. %. In rabbits fed cholesterol, or men under 50 with myocardial

infarction, cholesterol in this fraction may rise to over 150 mgm. %. A group of men, 41 to 50, who had myocardial infarcts, were matched with controls of the same age with the same blood cholesterol levels which averaged 290 mgm. % in the 55 men in each group. The Sf 12 to 20 cholesterol averaged 74 mgm. % in those with infarcts; 54 mgm. % in those in whom atherosclerosis had not become clinically apparent. When all the data on myocardial infarction and controls at this age were compared, the Sf 12 to 20 cholesterol averaged 80 mgm. % in those with infarcts, 45 in controls; the total cholesterol averaged 288 and 243 in the same groups. No other technique of fractionation has shown the atherogenic material concentrated in such a small fraction of the total, or such great variation between those who do and those who do not give a history of myocardial infarction. The globulin method shows that men with infarcts, compared with controls of the same age, show a rise in beta and fall in alpha globulin-bound cholesterol. Like the ultracentrifuge method, it has shown that two people with the same total cholesterol levels in their plasma may have very different levels of fractions which experience shows are pathologically significant. The application of these relatively costly methods, and the development of simpler techniques for separating the cholesterol in atherogenic molecules from that contained in those which are inert or even protective, will undoubtedly change many ideas about the relation of diet to blood cholesterol levels.

At one time it was thought blood cholesterol represented a waste product, much like urea or uric acid, which must pass from the cells to the bile. It was known that every vertebrate, perhaps every cell in the vertebrate, contained and perhaps could synthesize the material. Certainly chickens could lay many cholesterol-rich eggs and cows and sheep could excrete bile and milk containing cholesterol, although no cholesterol was present in the diet. While isotope studies have allowed quantitative examination of endogenous cholesterol production, it has been known for many decades that blood cholesterol was maintained, cholesterol-rich bile was excreted and total body cholesterol content rose in young growing animals on diets free of cholesterol. It has now been shown that all the cells in the body can produce cholesterol from acetate, that endogenous production exceeds the normal dietary cholesterol intake of carnivorous animals, and



that endogenous production is greatly depressed by high dietary intake in dogs, and to some degree in rabbits. When the cholesterol content of the diet is very high, the blood level rises in rabbits, but not in normal dogs or rats which have a much greater capacity to metabolize or excrete the exogenous material.

Since the blood level is not due merely to waste, but serves some function and is controlled by the tissues, and especially by the liver, the next problem to consider is what function do these molecules serve and why are the blood levels different in various species or under various conditions. The phospholipids certainly play some rôle in fat transport, serving to keep in colloidal solution or in fine suspension much larger quantities of neutral fat than could be emulsified in simple solution containing only the electrolytes, albumin and lipid-free globulins. Just how cholesterol functions is not clear. Levels of 60 mgm. % serve to maintain fat transport even during starvation in rats, rabbits and guinea-pigs, whose fat transport per kilo per hour probably is at least five times as rapid as in starving men. The latter may have plasma levels over 200 mgm. %. In other words, North Americans seem to have far more plasma cholesterol than is necessary for fat transport.

Kellner showed that giving detergents, such as Tween 80, to rabbits by vein caused a prompt rise in plasma cholesterol from the normal level of 60 mgm. % to levels over 1,000 mgm. %.<sup>9</sup> The hæmolysis caused by the initial injection was greatly reduced when subsequent injections were given at the height of the response. The rise was all endogenous, occurring in rabbits on cholesterol-free diets. Later Friedman showed that cholate, a natural detergent, had a similar effect in the rat.<sup>5</sup> It would appear that the body maintains the cholesterol level needed to protect its cells from detergents in the plasma. It has long been known that high fat diets caused increased hæmolysis and bile pigment excretion,<sup>10</sup> and that injections of fat-rich chyle or lymph also caused hæmolysis.<sup>11</sup> It is therefore quite possible that the rise in total plasma cholesterol which occurs in men given a high intake of cholesterol-free vegetable fat is due to this protective mechanism. The high endogenous levels in rabbits with alloxan diabetes or injected with detergents apparently have no atherogenic potentiality, and indeed appear to protect rabbits from atheromas if cholesterol is

fed to them.<sup>7</sup> It is therefore of great importance to determine whether high fat, low cholesterol diets cause a rise in the Sf 12 to 20 fraction, and in the beta-globulin fraction, or whether, as in cases of chronic jaundice, the rise is primarily in the harmless or protective molecules, rich in phosphorus. It is certain that this fraction is raised by detergents, and there is strong evidence that fat emulsion and high fat diets act like detergents, presumably by increasing plasma levels of sodium soaps. It is also certain that in animals one can raise the atherogenic fraction only by feeding cholesterol, not by giving high fat, low cholesterol diets. But there is as yet no data proving whether high fat diets protect from or augment the effects of dietary cholesterol in forming atheromas in men or animals.

In dogs there are remarkable effects of thyroid hormone and of protein in the diet in protecting from dietary cholesterol. High cholesterol supplements have no effect on dogs with normal thyroid function; the plasma cholesterol is unchanged. If the thyroid is inhibited by thiourea, cholesterol feeding causes high plasma levels and atheroma formation, even on diets liberal in protein.<sup>12</sup> If the diet of euthyroid dogs is practically protein-free, cholesterol feeding raises plasma levels, and high fat, protein-free diets lead to even greater changes on cholesterol feeding.<sup>13</sup> Lipotropic agents have no effect on inhibiting atheroma formation in dogs or rabbits.<sup>14</sup>

In relation to the effect of low protein diets on dogs, it is worth noting that in some patients on the rice-fruit-sugar diet for hypertension, a definite rise in the Sf 12 to 20 cholesterol fraction has occurred while the total blood cholesterol was falling.<sup>15</sup> The low fat content may lead to a fall in the protective species of cholesterol molecules, and the low level of protein metabolism may retard the rate at which the cholesterol absorbed from the bile is converted into a harmless form or is excreted. This is the most striking example of a situation in which total blood cholesterol fails to indicate the amount or even the direction of change in the harmful material in the plasma.

Since much of the argument about dietary cholesterol in relation to atheroma formation is derived from rabbit experiments it is necessary to compare their metabolic responses to those of man. There are strains of rabbits extremely resistant to cholesterol feeding and others in

whom it evokes a huge rise in plasma levels. Men show hereditary differences in their response to high fat-high cholesterol intake. Because of their large ratio of surface area to weight, rodents have high energy requirements, and baby rabbits consume milk with twice the fat and cholesterol content of human or of cow's milk. Their intake, per kilo per day, is more than 10 times that of our babies. As a result, their plasma cholesterol rises within a day after birth from its initial level, 60 mgm. %, to 180, and is from 220 to 300 during the four weeks of suckling.<sup>16</sup> It drops to 60 within a week after weaning. The human baby also has a level of 60 mgm. % cholesterol in its plasma at birth, which rises to 140 in ten days, and to 200 within a few months.<sup>17</sup> American babies are never really weaned, and the levels remain over 150 mgm. %, rising to 250 at the age of 50 or 60 years. In baby rabbits, lipid infiltration of the intima is evident after the first week of life, and it increases throughout the suckling period, but is reabsorbed and vanishes within two weeks of weaning, reappearing only if cholesterol is added to the diet. In our babies, a careful study at the University of Minnesota showed some lipid infiltration by the end of one month, doubled during the first year, and increasing during childhood.<sup>18</sup> A second peak in rate of deposition occurs in early adolescence, with a fall in rate, but an increase in total lipid accumulated, during early maturity. A third peak in rate of deposit occurs in the thirties, with a gradual decline in rate thereafter. These observations, made by Lober using classical methods of histopathology, proved that in North America lipid deposition goes on year in and year out from birth to old age, and is not especially rapid at the age when deaths from coronary disease are most frequent (Figs. 1 and 2). Death may be due to "the straw that breaks the camel's back".

From this description it will be seen that rabbits differ from men mainly in the ingestion of far more cholesterol per kilo when suckling, and in having lipid deposition in the intima which is more rapid during this period. The only basis for suggesting that dietary cholesterol, which is the only effective cause of atherosclerosis in dogs, chicks and rabbits, has no part whatever in atherogenesis in man is the fact that total cholesterol in man does not rise much when cholesterol is added to fat-free diets, but does rise when fat is added. Rates of endogenous chol-

esterol formation are very high in all these creatures, all of them can be fattened up on cholesterol-free diets, but no atheromas form. Yet when baby rabbits take their mothers' milk, containing only 50 mgm. % of cholesterol they begin to form atheromas, and a similar cholesterolosis of human sucklings was described by German pathologists many years ago. There, as in baby rabbits, the lesions vanished after weaning, which in European children involved a real fall in fat and cholesterol intake.

Adiposity in rabbits predisposes to rapid atherosclerosis when the diet contains chol-

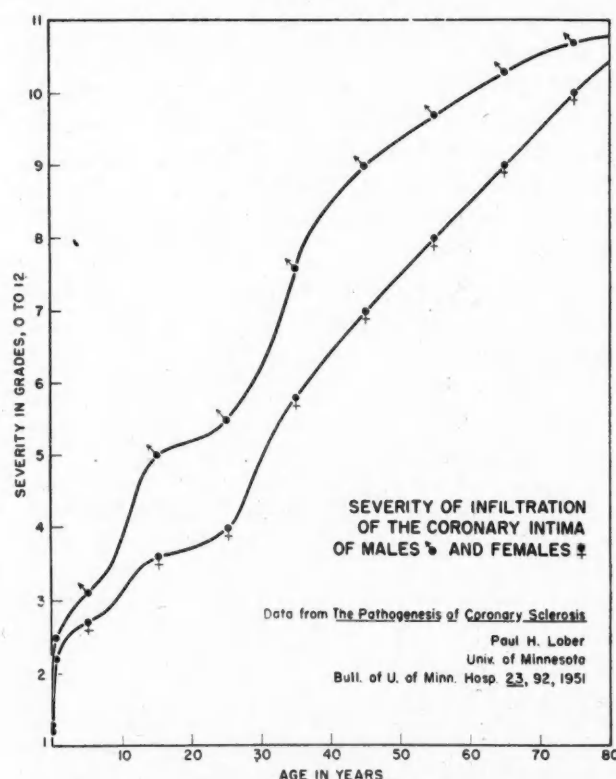


Fig. 1.—The paper cited gives data obtained from 536 autopsies, and each datum is the average of 10 to 47 cases in which the severity of lipid infiltration was graded 0 to 4 in the three major branches of the coronary system of each heart; maximum possible severity is 12. This shows the severity due to cumulative deposit of lipid, more marked in males from birth to age 80.

esterol<sup>19</sup> and so does a high-fat, low-protein diet in dogs fed cholesterol, but these factors do not cause atheroma formation on cholesterol-free diets. While it is probable that low protein diets hasten atherogenesis in man, and that obesity affects some of us as it does the rabbit, there is no proof that obesity or high-fat low-cholesterol diets, adequate in protein, cause atheroma formation in man, or that obesity or high fat content of diet hasten atheroma formation when the diet is rich in cholesterol. The report on coronary dis-

ease in the U.S. Army,<sup>20</sup> the studies on coronary disease in men under 40 in Boston,<sup>21</sup> and those under 46 in New York,<sup>22</sup> showed that underweight men were as frequent, overweight men no more frequent in coronary cases when compared with controls from the same population group. The severity of aortic atherosclerosis was not related to obesity in Denmark.<sup>23</sup> Thus, there is no evidence that obesity is a factor in human atherosclerosis.

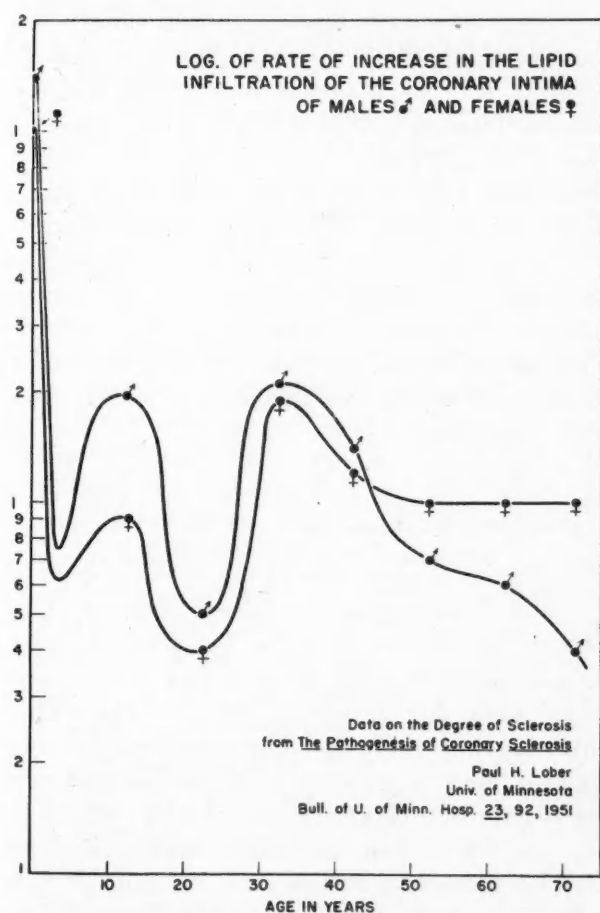


Fig. 2.—Here the data in Fig. 1 have been used as the basis for calculating the rates of lipid deposition in the coronaries from the change in severity observed at various ages. It will be noted that the rate, here plotted logarithmically, is five times as rapid in the first year of life as in any other year, and that the rate is relatively much greater in males at the second peak, during early adolescence, than in the third peak, in the early thirties. Total blood cholesterol is about 200 mgm. % from the second month to the twelfth year, falls below 180 in the late teens and reaches a peak of 250 mgm. % at age 55, when the rate of deposition, in males is only one-third as rapid as at age 30. The fall in rate in older males is probably due to the elimination by coronary disease of those who had fast rates in earlier decades.

The effect of fat in the diet also is not proved. Keys has shown that plasma cholesterol levels are lower, after the age of 30, in men in Mediterranean countries, who get 20% of their calories from fat, than in men from Northern Europe or North America who take over 30% of their

calories as fat.<sup>24</sup> The low incidence of atherosclerosis in the Mediterranean areas has long been known, but it must be pointed out that in Italy and elsewhere around that fabled sea olive oil, free of cholesterol, takes the place of animal fats, containing cholesterol, so that the difference in atheromas may be ascribed to the difference in dietary cholesterol intake just as much as, or perhaps more than, to difference in fat intake. For the fat intake, which raises total cholesterol, may only raise the atherogenic fraction when it causes an increase in reabsorption of biliary cholesterol, or of dietary cholesterol, and it probably raises the protective phosphorus-rich lipids even when the diet is cholesterol-free.

One of the most peculiar features of atherosclerosis is that men, who have about the same plasma total cholesterol levels as women and show about the same rate of atheroma formation in the abdominal part of the aorta and in the iliac arteries, form atheromas much more rapidly in the coronary arteries. We have observed, and others<sup>18</sup> have confirmed, that males have thicker coronary intimal layers, even at birth. Both sexes have, from birth, very much thicker intimas in the epicardial part of the coronary arteries than in any arteries of comparable size elsewhere in the body, such as the radial, or the mesenteric. This presumably is why the coronaries have more severe infiltration by lipid than any other arteries, and the sex difference in thickness must be a factor in predisposing men to coronary disease. However, both the beta-globulin fraction of cholesterol, and the Sf 12 to 20 fraction, are higher in young men than in young women. In the Sf 12 to 20 fraction the values, at age 30, are 40 mgm. % in normal men, 22 mgm. % in normal women,<sup>8</sup> while the beta-globulin values are 69 and 58 mgm. %.<sup>6</sup> Barr<sup>25</sup> demonstrated that full doses of oestrogens caused the cholesterol pattern in the globulin fractions to revert to the female type even in older men with very high initial beta-globulin levels. Stamler,<sup>26</sup> testing this in chicks fed cholesterol, found that not only oestrogens, but oestrogens plus sufficient androgen to maintain masculine secondary characteristics, completely inhibited the development of coronary lesions, but did not lower plasma cholesterol nor reduce the severity of aortic atherosclerosis. One explanation could be based on Wilens' evidence that the intima actively participates in depositing lipids when plasma percolates through it, and suggest that sex hormones may act to



inhibit this mechanism more effectively in the coronary intima, which has more ground substance and fewer collagen fibrils than in the aorta. But the more probable explanation is suggested by Stamler's data on the phospholipid levels in the chicks. These were four times higher in chicks given oestrogens, and three times higher in those on oestrogen-androgen mixtures, than in controls or those on androgens alone. The ratio of cholesterol to phospholipid was three times higher when oestrogen was given, with or without androgen, than in the controls. Actually, the oestrogen-treated birds, which were practically free of coronary plaques, had higher cholesterol levels than chicks in control groups, some of which showed plaques in the coronaries of every bird. These experiences show how misleading cholesterol values alone may be when studying atherosclerosis, as well as how aortic disease may follow a course different from that in the coronaries; all these chicks had comparable aortic atherosclerosis due to cholesterol feeding.

It has long been known that cholesterol rarely deposits in the skin, as xanthomas, at levels under 400 mgm. %, but that at levels over 1,500 such lesions may form rapidly. In biliary hypercholesterolaemia skin lesions may be severe, aortic lesions trivial and coronary lesions absent. Here the phospholipid levels are very high, and apparently protect the coronaries completely. Diabetics, who have definite but less marked elevation in phospholipid, also have skin lesions and lesions in the vessels of the legs, much more severe in relation to coronary disease than in the arteriosclerosis in non-diabetics, where the phospholipid level is lowest.

In man and in the chick, the aorta reacts more like skin than like the coronaries, and here lipid deposition occurs when phospholipid levels are high enough to protect the coronaries. The amount of phospholipid in the alpha-globulin fraction appears to be 25% higher in young women than in young men, but after the menopause the sex difference disappears.<sup>6</sup> Lober's data indicate that in young women, lipid deposits in the coronaries at a rate 20% less than in men, and the cumulative result is 30% more severe coronary infiltration in men of 50 than in women (Figs. 1 and 2). Aortic atherosclerosis, in man as in the chick, seems not to be prevented by the difference in the phospholipids which retard coronary sclerosis. The sex difference in coro-

nary disease has an endocrine as well as an anatomical basis; the latter as well as the former probably showing wide differences depending on heredity.

Another substance which changes plasma lipids and retards atherogenesis in experimental animals is heparin.<sup>8</sup> Injected in doses well below the level which changes clotting time, this natural polysaccharide causes a decline in the Sf 12 to 20 cholesterol, and also may cause clearing of lipaemic plasma, with little or no effect on total cholesterol. The effect does not occur when heparin is added in larger amounts to plasma *in vitro*, so that it seems to activate enzyme systems which normally would act more slowly. This action of heparin can be observed in patients with high Sf 12 to 20 levels when given only twice a week. While there may occasionally be reasons for giving heparin, or oestrogen-androgen, injections to patients to retard atheroma formation, this does not offer a practical solution for the control of a disorder which affects most of the population, and which goes on for decades.

#### EFFECTS OF DIET

While there is now almost universal agreement that atherosclerosis is due to deposition of cholesterol originally carried by the plasma, there is no agreement on the effect of diet on man, nor on the ideal diet to prevent atherosclerosis. One physician, in New York, recommends low-calorie, high-fat diets, apparently with the feeling that the rise in total cholesterol invoked by this diet, like that due to injecting rabbits with detergent, may be protective rather than harmful. A few authorities stress obesity as the sole factor, while others put the blame on endogenous cholesterol metabolism. Among the members of the latter school, some consider the condition a simple Mendelian trait, a hereditary metabolic disorder, independent of the diet, while others believe the defect merely prevents proper response to high fat intake. Some of the authorities who believe that the disease results from defective response to high fat diets state that dietary cholesterol, which is so important in animal experiment, has no effect whatever on man, and that it is a "futile gesture" to reduce cholesterol content of the diet.<sup>27</sup> Our own view is that substances which are harmful to animals must be assumed to be harmful to men, until proved

innocuous by convincing evidence. There is no proof whatever that man is not harmed by diets as rich in cholesterol as whole milk or that he would not develop atheromas as fast as experimental animals if given diets equally rich in cholesterol as those used to produce quick results in experiments. Indeed the studies of rate of lipid deposition in man show clearly that a whole milk diet causes very rapid coronary infiltration in infancy, in man as well as in rabbits.

The main sources of animal fat in the American diet are the same food items which are rich in cholesterol—butter fat in cream, milk and butter; egg yolk, and shortening made from animal fats. The practical person, then, may well ask, "Why quibble over the relative importance of the fat and the cholesterol, since one can not easily prescribe a low fat diet without greatly decreasing cholesterol intake at the same time?" If one prescribes a diet of lean meat, green vegetables and fruit, in order to keep down the tendency to obesity, the diet will surely be low in cholesterol, as well as in calories and fat. These items are those used by the races notably free from atherosclerosis. They are adequate to maintain health in all adults, while our "normal" diet, rich in eggs and milk products, is a relatively recent aberration in adult nutrition, one which no native races or animals have ever used. If the doctor concludes from the facts already known that atherosclerosis may be due to our curious diet, and that those who are threatened by arterial disease should live on a more natural diet, he will not need to decide whether dietary cholesterol is as important in man as in animal experiment.

But some experiments of the last two years have brought to light new facts which make it vitally important for all who deal with patients to know whether it is the fat or the cholesterol in our diets which elevates the atherogenic fraction of the blood cholesterol and leads to atheroma formation. If chicks taking a diet rich in cholesterol, which usually raises their plasma level and causes rapid plaque formation, are fed either sitosterol (a vegetable sterol) or dihydrocholesterol (synthetic) in doses double the daily cholesterol intake, the uptake of cholesterol is blocked, the plasma level does not rise, and no plaques form.<sup>28, 29</sup> Now this is what all patients hope for—to go on eating what they like, plus some harmless supplement to prevent harm from

the diet. Sitosterol is not tasty, but dihydrocholesterol is practically tasteless. Dihydrocholesterol is produced by the body and excreted by the gut, but neither of these sterols is absorbed from the gut. Apparently both block the absorption of dietary or biliary cholesterol by the bowel. The close structural relationship of these sterols is pointed out in the legend of Fig. 3.

If dietary cholesterol is unimportant in man, this form of blocking therapy also is unimportant, and the patient would only be helped by a low-fat, low-calorie diet. If dietary cholesterol, and cholesterol reabsorbed from bile, are the sources of the molecules which form plaques, then these blocking agents, in doses of 2 to 4 grams per meal, should offer complete protection against any diet. If the effects of these agents on patients are followed only by measuring total

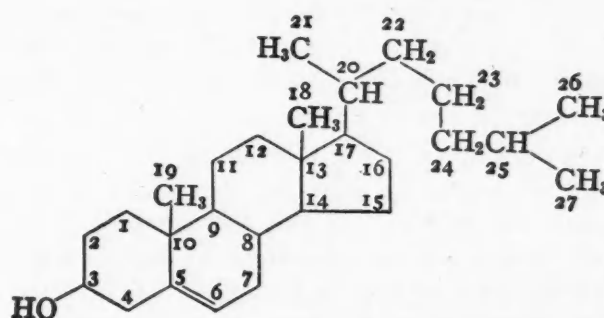


Fig. 3.—The cholesterol molecule. In dihydrocholesterol the only difference in structure is an extra hydrogen at 5, and no double bond between 5 and 6. In sitosterol an ethyl radicle replaces one hydrogen at 24; in stigmasterol there is the same structure but with one less hydrogen at 22 and a double bond, 22 to 23. Except for cholesterol none of these can be absorbed through the intestine; dihydrocholesterol and the vegetable sterols block cholesterol absorption.

plasma cholesterol, little or no effect should be apparent, since reduction of exogenous cholesterol has little effect on this when men take their usual amount of fat. However, if the blocking agents can strikingly reduce the cholesterol in the Sf 12 to 20 fraction of patients continuing on the same diet they used prior to an episode of myocardial infarction, there would be some basis for believing that, in man as in all experimental animals, dietary cholesterol, not dietary fat, causes a rise in atherogenic cholesterol compounds.

The solution of the situation, in which most authorities claim that man does not react to cholesterol like other animals or birds, is important not only to our patients, but to the industries which market dairy products, eggs and lard. Evidence that fat alone is responsible for



our high rate of early coronary disease would affect the prosperity of all these industries, and of those marketing vegetable fats as well. On the other hand, if it were proved that men, like animals, are sensitive to ingested cholesterol, but not to fat, and that cholesterol uptake could be blocked by a tasteless and relatively inexpensive dietary supplement, the prospect for patients and for these industries is much brighter. Ice-cream would cost little more and be just as delicious if it contained 1 gram of dihydrocholesterol per pint. Not only millions of man-years of life, but millions of dollars a year depend on whether cholesterol or fat is the agent causing human atherosclerosis. The outlook for the dairy industry and for the man with coronary disease is much darker if the rate of atherosclerosis can only be retarded if we reduce the fat content of our diets from the present level (over 30% of calories) to the level of the impoverished peoples of the world, who are free of atheroma on diets nearly free of cholesterol and with less than 20% of their calories from fat.

We can not give our patients the final answer to the questions "What is the cause of my trouble? Can I go on with my usual diet and take something like a vitamin to protect me?" But we must give some sort of answer to each patient today, on the basis of our own interpretation of the evidence. I would tell him that it probably is the excess of cholesterol in our diet, even more than the excess of fat and calories, which leads to arteriosclerosis in all but the few who inherit metabolisms as efficient as those of dogs and rats. A diet list, like Table I, will show him that many foods contain enough cholesterol and fat to cause atherosclerosis, just as milk diets in infancy start the process in a baby's coronary arteries. No grains, vegetables, fruits or nuts contain any absorbable sterol; their sterols serve to block cholesterol absorption. The rate of cholesterol deposition is slow in most of us, and, eat what we like, we can hope to avoid illness until an age when Osler and Ecclesiasticus thought death was a blessing. However, if we have hypertension, bad family histories, or have already had a bout of coronary disease, it would be reasonable to avoid the foods as rich in cholesterol as whole milk. It certainly is essential to maintain a liberal protein intake. If we are young enough to have dependent children, it is selfish and thoughtless to eat an atherogenic diet when we know that our risk is greater than

average. If we have no dependents, we can prefer to eat dangerously but pleasantly.

How can the man who changes his diet, or who takes sitosterol or dihydrocholesterol, tell whether this is doing him any good? While fall in total cholesterol may be encouraging, it is not decisive, and failure to fall, when fat content of the diet is maintained, has no significance. The value of diet, of blocking agents, of heparin or of androgen-oestrogen therapy can be followed better when one can periodically measure the alpha-globulin-bound/beta-globulin-bound chol-

TABLE I.  
THE CHOLESTEROL CONTENTS OF FOODS IN RELATION TO  
CALORIC AND PROTEIN CONTENT

Food	Cholesterol per 100 gm.	Cholesterol per 2,000 cal.	Cholesterol per 100 gm. protein
	mgm.	mgm.	mgm. over
Lard.....	140	300	1,000,000
Brains.....	2,200	36,000	30,000
Butter.....	280	700	28,000
Egg yolk.....	2,000	9,000	20,000
Cream, 40%....	150	800	7,500
Fresh eggs.....	480	5,600	4,000
Cream, 20%....	75	700	2,500
Liver.....	320	5,000	2,000
Shell fish.....	145	2,000	600
Whole milk.....	20	600	600
American Cheese (from whole milk).....	160	660	530
Pot cheese (from skim milk).....	80	500	260
Lean fish meat..	45	740	250
Lean beef.....	60	800	250

Since babies develop cholesterosis when on diets containing milk alone, it seems safe to consider any diet with over 500 mgm./2,000 calories or 500 mgm./100 gms. protein as potentially atherogenic. A diet with 100 gm. of protein from pot cheese, lean meat or fish, and 1,600 calories from vegetables and fruit would contain less than 300 mgm. of cholesterol.

Severe atherosclerosis develops in two months in chicks given a diet with 1,000 mgm. cholesterol/100 gm; 5,000 mg./2,000 cal., and 7,000 mgm./100 gm. protein.

esterol ratio, or the Sf 12 to 20 cholesterol fraction. These determinations are not available in most cities and clinics, and are prohibitively costly. Until simpler methods are evolved we can merely wait for the reports from those using these controls on therapy, and trust that harmless things like blocking agents or diet will prove of value. We will rarely use heparin or endocrine therapy until their usefulness and hazards have been fully proved, and the ineffectiveness of other methods equally firmly established. If it is convenient, we may have total cholesterol mea-



sured now and then, although we can not be confident of the significance of any results, on ourselves or in research reports, where only total cholesterol is measured. But we are supported by a great weight of evidence if we believe that atherosclerosis in man is controllable and preventable, and we can not be considered unduly hopeful if we believe this will be achieved without giving up our favourite foods.

# SUMMARY

Arteriosclerosis, in North Americans, begins in early infancy and the rate of lipid deposition shows three peaks, the highest in the first year of life, with lower peaks in early adolescence and early middle age. The process depends on inability of most human beings to deal with the modern high fat, high cholesterol diet. In animals very rapid atherosclerosis can be produced, even in immature individuals, by high cholesterol intake; high fat diets or fattening on carbohydrate has not been shown to lead to atherosclerosis in men or animals on low cholesterol diets with good protein content. Men with coronary disease early in life are no more obese than controls still free of symptoms.

Cholesterol reabsorption can be blocked by other sterols, which in themselves are not absorbed. This suggests the possibility of control by dietary supplement rather than restriction. At present, a low fat, low cholesterol diet is reasonable for those with precocious onset of arteriosclerosis, but the protein content should be liberal.

Heparin, in subanticoagulant doses, and oestrogen-androgen mixtures given so as to avoid feminization, also produce a more normal pattern of plasma lipids without much effect on total plasma cholesterol levels. These types of parenteral therapy are not applicable to control of a disorder affecting most of the population, but if cholesterol excess proves to be the cause and can be controlled by supplements to the diet, the chief mode of death in North America may be brought under control. Should it be proved that man, unlike other animals, is unaffected by excess cholesterol feeding, and his vascular disease is a result of the excess fat, the outlook for control is bleak. It would involve a change in diet, from early childhood on, which the population would never accept.

# REFERENCES

1. WILENS, S. I.: *Am. J. Path.*, 27: 825, 1951.
2. ANITSCHOW, N.: *Deutsche med. Wchnschr.*, 50: 1215, 1914.  
*Idem: München med. Wchnschr.*, 68: 1538, 1921.
3. WILENS, S. I. AND MCCLUSKEY, R. T.: *Am. J. M. Sc.*, 224: 540, 1952.
4. GOULD, R. G.: *Am. J. Med.*, 11: 228, 1951.
5. BYERS, S. A., FRIEDMAN, M. AND ROSENMAN, R. H.: *Metabolism*, 1: 479, 1952.
6. BARR, D. P., RUSS, E. M. AND EDER, H. A.: *Am. J. Med.*, 11: 468, 1951.
7. DUFF, G. L. AND MCMILLAN, G. C.: *Am. J. Med.*, 11: 92, 1951.
8. JONES, H. B., GOFMAN, J. W., LINDGREN, F. T., LYON, T., GRAHAM, D. M., STRISOWER, B. AND NICHOLS, A. V.: *Am. J. Med.*, 11: 358, 1951.
9. KELLNER, A., CORRELL, J. W. AND LADD, A. T.: *J. Exper. Med.*, 93: 385, 1951.
10. JOSEPHS, H. W., HOLT, L. E., TIDWELL, H. C. AND KAJDI, C. N.: *J. Clin. Investigation*, 17: 532, 1938.
11. CREDITOR, M. C.: *Proc. Soc. Exper. Biol. & Med.*, 82: 83, 1953.
12. STEINER, A. AND KENDALL, F. E.: *Arch. Path.*, 42: 433, 1946.
13. LI, T. W. AND FREEMAN, S.: *Am. J. Physiol.*, 145: 660, 1946.
14. DAVIDSON, J. D.: *Am. J. Med.*, 11: 736, 1951.
15. HATCH, F. T. AND KENDALL, F. E.: *Circulation*, 4: 472, 1951.
16. BRAGDON, J. H.: *Circulation*, 5: 641, 1952.
17. SPERRY, W. M.: *Am. J. Dis. Child.*, 51: 84, 1936.
18. LOBER, P. H.: *Bull. of U. of Minn. Hosp. & Minn. Med. Found.*, 23: 92, 1951.
19. FIRSTBROOK, J. B.: *Science*, 111: 31, 1950.
20. YATER, W. M., TRAUM, A. H., BROWN, W. G., FITZGERALD, R. P., GEISLER, M. A. AND WILCOX, B. B.: *Am. Heart J.*, 36: 334, 1948.
21. GARN, S. M., GERTLER, M. M., LEVINE, S. A. AND WHITE, P. D.: *Ann. Int. Med.*, 34: 1416, 1951.
22. SPAIN, D. M., BRADLESS, V. A. AND HUSS, G.: *Ann. Int. Med.*, 38: 254, 1953.
23. FABER, M. AND LUND, F.: *Arch. Path.*, 48: 351, 1949.
24. KEYS, A.: The cholesterol problem. International Congress of Dietetics, 1952.
25. BARR, D. P., RUSS, E. M. AND EDER, H. A.: *Tr. A. Am. Physicians*, 65: 102, 1952.
26. STAMLER, J., PICK, R. AND KATZ, L.: *Circulation Research*, 1: 94, 1953.
27. GUTMAN, A. B.: *Am. J. Med.*, 15: 1, 1953.
28. PETERSON, D. W., NICHOLS, C. W. JR. AND SHNEOUR, E. A.: *J. Nutrition*, 47: 57, 1952.
29. SIPERSTEIN, M. D., NICHOLS, C. W. JR. AND CHARIKOFF, I. L.: *Circulation*, 7: 37, 1953.

The clinical procedures which are most effective in the cancer detection program do not require a specialist but are suitable for the general practitioner's office. Their success requires an alert and interested physician and adequate time for the examination. In the emphasis on the rôle of the physician, this type of program differs substantially from multiphasic screening programs which rely primarily on laboratory procedures. However, reliable laboratory facilities for Papanicolaou smear readings, biopsy, and x-ray services must also be available to complete the cancer detection examination. If both physicians and laboratories that meet these standards can become widely available, the goal of the American Cancer Society to make "every doctor's office a detection centre" will be a reasonable development in medical care, not only for cancer but for general adult preventive medicine as well.—E. Day, T. G. Rigney and D. F. Beck: *Am. J. Hyg.*, May, 1953.

# DIGESTIVE SYMPTOMS IN ANGINA PECTORIS: A CLINICAL STUDY\*

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DIGESTIVE SYMPTOMS during the attack of coronary thrombosis are well known; not infrequently they prevail over the genuine cardiac symptoms. This is by no means true for the digestive symptoms occurring during or after the attack of angina pectoris. In fact, the latter are only occasionally mentioned, as a rule, in the textbooks.

It is likely that the data of this particular problem have often been misrepresented on account of the fact that, for many years, medical interest has been focused on the nervous cardiac troubles originated by digestive reflexes. This notion, first introduced by Rosenbach, has been known in recent years as the "gastro-cardiac syndrome" (Roemheld<sup>1</sup>). Furthermore, the term angina has often been inaccurately employed in different types of precordial pain, and this may have been a cause for confusion.

The present study was undertaken in an effort to determine the frequency and the clinical features of the digestive symptoms in "true" angina pectoris. Since, as far as we know, there are no studies in this respect, it is felt that a better knowledge may be of some aid for diagnostic and, possibly, prognostic purposes.

**Material for study.**—The study was carried out on 660 detailed history cases of angina pectoris. The diagnosis was ascertained in every case by the direct causal relationship of the substernal or atypically located pain with exercise and by the favourable effect of nitroglycerine. It was often supported by the electrocardiographic evidence of cardiac anoxemia, but this was not a *sine qua non* in the diagnosis.

The patients' ages ranged between 29 and 80 years. The majority, however, (86.2%) were to be found in the age groups of 40 to 60.

The occurrence of a coronary thrombosis attack was carefully investigated. In the total series there were 102 cases (15.5%) of myocardial infarction, prior or subsequent to angina pectoris.

This was ascertained by electrocardiographic criteria or presumed by clinical results.

The cases presenting some form of digestive complaints (*viz.*: abdominal pain, nausea, vomiting, sialorrhoea, belching and flatulence) were selected for a closer study. The association with peptic ulcer has been dealt with in a previous paper.<sup>13</sup> Digestive symptoms as unrelated to a concurrence of ascertained digestive disease will be reviewed in this study.

## RESULTS

**1. Vomiting, nausea and secretory troubles.**—Nausea and vomiting were an infrequent finding. In fact, only 8 cases (1.2%) were listed in our series. Two of these are worth some development on account of their atypical features.

The first patient complained chiefly of being nauseated after exercise. Nausea was more marked than precordial pain, the latter being of little importance to the patient. The second patient related that his substernal pain subsided as a rule only after vomiting spells. Such cases are very uncommon indeed and may be considered an angina equivalent.<sup>2</sup>

Sialorrhoea is another atypical manifestation in angina pectoris. The following case history offers an example of this secretory trouble.

## CASE 1

R.G., a 54 year old woman had been complaining for the last 10 years of left axilla pain radiating down left arm, occurring after exercise. Occasionally, when walking on cold days or when carrying a weight, the patient complained of a very abundant secretion of saliva, which compelled her to stop and which subsided after rest. The electrocardiogram presented a conspicuous T wave inversion in aVF and in the left precordial leads.

**2. Flatulence and belching.**—In our series there were 39 patients who complained of marked and constant aerophagia. It should be pointed out that in our study we only included the patients to whom the digestive symptoms were of such importance that they complained of them spontaneously. Indeed the sensation of substernal distension caused some of these patients to believe that they had "indigestion".

With regard to belching a clinical classification was needed, and that of Alvarez proved useful.<sup>3</sup> It distinguishes: (a) the involuntary gas expulsion from the stomach; (b) the attack consisting in swallowing down and successively expelling the air; and (c) a somehow voluntary tendency to belching, in which the patient tries

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to relieve the gastric distension by voluntary belching.

In most of our series the belching occurred towards the end of the angina attack and appeared to be involuntary. The belching spells, where the tendency to expel the air was supported by air swallowing, were seldom observed. It was also found that some patients, who did not belch, complained of flatulence at the end of the attack; they tried to relieve it by voluntary belching.

Quite often it seems as though belching relieved the anginal attack. In such instances, it is a rather common finding that the patient ascribes his retrosternal trouble to the digestive system, chiefly to the stomach. The following histories will illustrate this:

#### CASE 2

F.K., a 56 year old male. The angina syndrome began 4 years ago and was typical, consisting in attacks of constrictive retrosternal pain with left arm radiation, lasting for 5 minutes and provoked by exercise. The attacks were accompanied by flatulence and the pain disappeared progressively after he belched; the patient then believed that all his troubles were induced by "aerophagia" and kept trying gastric adsorbents.

Sometimes the flatulence may induce an "état de mal".

#### CASE 3

B.M., a 54 year old male. This patient complained for the last 2 years of typical retrosternal pain after exercise, constantly followed by belching. A few months after the beginning of this syndrome the patient experienced a very severe nocturnal substernal attack, which lasted for several hours. Since then the attacks became very frequent. The pains in decubitus were the most severe. The symptoms had a constant sequence and the most distressing seemed to be the flatulence, which induced an "état de mal". The patient asserted that often in the night he would take nitroglycerine and would massage his abdomen in order to expel the gas. He had the urge to belch but he could not and had only transient relief from nitroglycerine.

As in a few cases flatulence after the angina attack appeared suddenly after an attack of coronary thrombosis, the hypothesis that the tendency to flatulence may be fostered by a previous coronary thrombosis attack has been put forward. Laubry *et al.*<sup>4</sup> noticed flatulence fairly frequently at least during the weeks or months following the cardiac infarction. They assumed that this was a prolongation of the gaseous distension induced in the acute attack of coronary thrombosis.

In our series there was evidence of myocardial infarction in 11 of the 39 patients. This means a

percentage of 28 as compared to 11.5%, determined in the total series of 660 patients. Unfortunately we could not determine whether the coronary thrombosis attack had actually induced or aggravated the digestive syndrome.

The following case in our series will illustrate this finding.

#### CASE 4

C.A., a 55 year old male, has complained for the last 3 years of precordial pain, with typical angina features. Several months after the beginning of his angina pectoris he developed a posterior myocardial infarction. Since this attack the recurring angina pain has constantly been accompanied by belching.

#### DISCUSSION OF PATHOGENESIS

A pathogenetic interpretation of the "aerophagia" syndrome in angina pectoris is difficult to determine inasmuch as aerophagia is a rather obscure chapter in pathological physiology.

In fact a complete interpretation for the present findings is not available because one should distinguish between spontaneous belching and true aerophagia. According to White<sup>5</sup> the belching at the end of the angina attack is due to a reflex cardiospasm, through some reflex connections between the heart and the cardia. Verdon, and later Jackson and Jackson<sup>6</sup> asserted that angina itself was due to spasmodic contractions of the oesophagus. They supported this assertion with such arguments as the calming action of belching and the experimental finding that the electrical stimulus of the dog's oesophagus induced muscular contractions in the supposed dermatome of the angina-referred pain.

According to Alvarez' x-ray studies, in true aerophagic subjects the swallowed air descended to the distal segment of the oesophagus and the air seldom went beyond the cardia. The subjects swallowed air seemingly to alleviate their symptoms. This is rather similar to one's scratching oneself for itching skin, which is associated with an increased need to continue scratching.

We will attempt hereunder to integrate the gastric and colic symptoms, as found in our series.

(a) The belching accompanied or followed the end of the angina attack. This was the most frequent finding in our series. Spontaneous belching, which may be due either to cardiospasm or to reflex antiperistaltic waves, was more frequent than the belching spell. The belching spell seems to be an acute "true aerophagia": the air is expelled after being swallowed

through spasmodic contractions. There is probably no true aerophagia in the former case.

(b) The flatulence: seldom does the angina attack appear in the background of previous digestive symptoms. The latter become worse and sometimes seem to provoke the attack. More often flatulence appeared after the beginning of the angina syndrome. A tentative explanation may ascribe the flatulence to the habit which the patients are developing of swallowing air with the hope of alleviating the pain felt in the "stomach". This is true aerophagia and its cause is presumably the angina pain somehow wrongly located.

(c) The colic distension and flatus are infrequent. They are not likely to be attributed to digestive causes. They appear, as a rule, only after the beginning of the cardiac syndrome. Their sudden appearance at the end of the attack is highly suggestive of a reflex mechanism. According to Wolf and Wolf<sup>7</sup> such phenomena are due to changes of the intestinal muscular tonus, which are supposed to induce perturbations of the gas changes in the intestinal vessels. According to Cantor<sup>8</sup> hypertensive patients often complain of flatulence.

In some patients, as described, the tendency to flatulence has been induced by a coronary thrombosis attack. It may be inferred that the acute attack, through its neuro-vegetative impact, opens up the path of cardio-digestive reflexes.

With regard to the worsening action of true aerophagia on the angina attacks, some experimental work accounts for vasoconstrictive coronary reflexes originating in the stomach and mediated by the vagus. According to Greene<sup>9</sup> coronary reflexes can be induced through gastric stimulation in the dog and may be vasoconstrictive as well as vasodilator or both. Gilbert *et al.*<sup>10</sup> experimenting on dogs, obtained after distension of the stomach a decrease of 15 to 35% of the coronary output. The coronary output was unchanged when vagotomy or atropinization had been performed.

In a second series of experiments<sup>11</sup> the same authors subjected 10 patients suffering from angina pectoris to the Levy's anoxæmia test. The "experimental pain" appeared after a certain measured time which was constant for a given patient. The pain appeared sooner when the stomach was distended by a previous meal. This effect was abolished by atropine.

It must be borne in mind, however, that experimental work on coronary output and especially on its reflex determinants are subject to many errors of interpretation, as demonstrated by Gregg.<sup>12</sup> Accordingly, more facts are needed to support an interpretation of the clinical findings described.

#### SUMMARY AND CONCLUSION

1. A clinical and statistical study is presented concerning the frequency and the clinical features of digestive symptoms in angina pectoris in the absence of a digestive disease.

2. Whereas nausea, vomiting and secretory troubles are uncommon, flatulence and belching were found to be a fairly frequent complication of angina pectoris. A tentative pathogenesis is offered, which ascribes these phenomena either to reflex perturbations or to true aerophagia.

3. Myocardial infarction was found more frequently in patients complaining of flatulence than in the total series. It is believed that in some cases the digestive troubles are a distant sequel of an attack of coronary thrombosis.

On this evidence it is felt that a detailed cardiac study is justified in middle aged or aged patients who complain of an aerophagia syndrome of recent appearance.

The authors would like to express their indebtedness to Dr. Jean Lenègre, chief physician of the Department of Cardiology, Hôpital Boucicaut, whose kind co-operation made this study possible.

#### REFERENCES

1. ROEMHELD, L.: *Am. J. M. Sc.*, 182: 13, 1931.
2. FROMENT, R. V. AND COBLENTZ, B.: *Lyon Med.*, 36: 250, 1944.
3. ALVAREZ, W.: *An Introduction to Gastro-enterology*, P. B. Hoeber, New York, 1st ed., 1948.
4. LAUBRY, C., SOULIÉ, P. AND HEIM DE BALZAC: *Arch. Mal. Cœur.*, 31: 583, 1938.
5. WHITE, P. D.: *Heart Disease*, Macmillan, New York, 3rd ed., 1947.
6. JACKSON, D. AND JACKSON, R.: *J. Lab. Clin. Med.*, 21: 993, 1936.
7. WOLF, S. AND WOLF, H. G.: *Human Gastric Function. An experimental study of a man and his stomach*. Oxford University Press, New York, 1943.
8. CANTOR, J. L. AND MARKS, J. A.: *Ann. Int. Med.*, 3: 403, 1929.
9. GREENE, G. W.: *Am. J. Phys.*, 113: 399, 1935.
10. GILBERT, N. AND LE ROY, G.: *Am. Heart J.*, 20: 519, 1940.
11. GILBERT, N., LE ROY, G. AND FENN, W.: *J. A. M. A.*, 114: 1962, 1940.
12. GREGG, D. E.: *Coronary Circulation in Health and Disease*, Lea & Febiger, Philadelphia, 1st ed., 1950.
13. CARASSO, B. AND LONGTIN, J.: *Un. Med. Can.*, 81: 1076, 1952.



## PURPURA FULMINANS WITH AFIBRINOGENÆMIA\*

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PURPURA FULMINANS described by Henoch in 1886, is a rare condition. It is characterized by the rapid spread of symmetrical, bluish-black hæmorrhages into the skin, affecting mainly the extensor surfaces of the extremities and showing a tendency to deep necrosis and the formation of sero-sanguineous bullæ. The hæmorrhagic areas are well defined and are surrounded by œdema. These lesions are accompanied by a high fever and intense systemic symptoms. In the large majority of cases described in the literature death occurred within a few days after the onset. The disease appears after a latent period of several days or weeks following scarlet fever

### CASE REPORT

A 3½ year old white male child was admitted to the Providence Hospital, Moose Jaw, February 27, 1951. The history obtained from the parents indicates that 6 weeks prior to admission the child had a generalized reddish rash, which was present all over his body but spared his face. The child was ill for about 7 to 10 days with fever and night sweats. The mother considered that the child had the measles and did not call a physician. The child seemed to make a partial recovery, but continued to have persistent nasal symptoms. Two weeks prior to admission he developed a sore throat accompanied by recurring fever and night sweats which gradually improved, until approximately a week before admission when swelling developed in the neck at the angle of the jaws and another reddish rash was seen on the body. A physician was then called to see the child and diagnosed acute tonsillitis. He prescribed a liquid medicine which possibly contained sulpha medication. Some difficulty was experienced by the child in taking this medication, and as he grew worse he became unable to swallow fluids. The fever continued and one day before admission to hospital vomiting occurred and several hæmorrhagic areas were noted on the face and trunk. Another physician was called and arrangements for hospitalization were made.

Physical examination on admission showed the child to be acutely ill with a temperature of 100.8° F., and

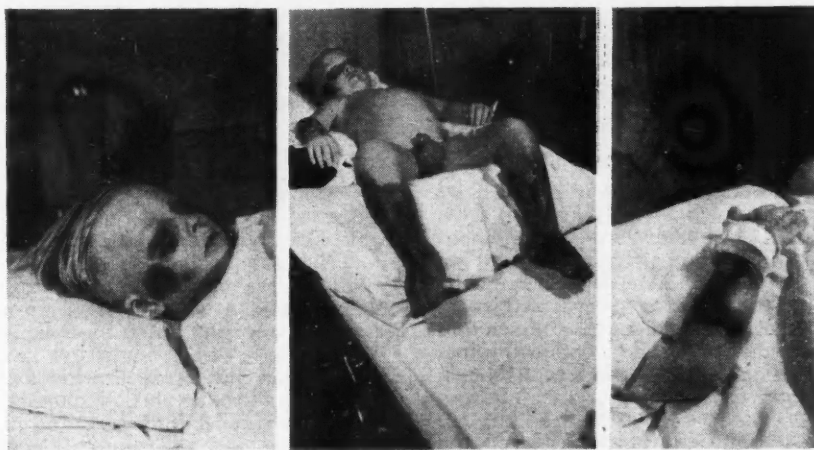


Fig. 1.—Demonstrates circumorbital œdema and hæmorrhage and lesion on the right cheek. Fig. 2.—Demonstrates œdema of the scrotum and hæmorrhagic and bullous lesions on both legs. Fig. 3.—Hæmorrhagic and bullous lesions on the right forearm

or other exanthematous febrile illnesses which are usually mild in character, and it may represent a reaction of extreme hypersensitivity to an "allergen", as was already suggested in 1916.<sup>1</sup> The tissue damage resulting from the extensive antigen-antibody interaction may be related to the Arthus or Schwartzman phenomenon where similar necrotic and hæmorrhagic cutaneous lesions occur.

While cases of purpura fulminans by themselves are of sufficient interest to warrant reporting, the case described hereunder was associated with complete incoagulability of the blood due to absence of fibrinogen, and in addition showed a number of other interesting findings.

tachycardia of 120 beats per minute. The child was bleeding from both nostrils and hæmatomata were noted in the loose tissues around both orbits, the right being more marked than the left. Ecchymoses were seen over the right cheek (Fig. 1), near the left scapula and in the scrotum over the left testicle. The throat showed both tonsils grossly enlarged so that they met at the mid-line. No definite exudate was seen. The palate was high and arched and there were two small palatal hæmorrhages. The cervical lymph nodes were enlarged on both sides. No other lymphadenopathy was detected. The heart was normal except for tachycardia. The chest was clear. The blood pressure was 110/60. The abdomen was not remarkable; neither liver, spleen nor kidneys were palpable. There were no findings on a routine examination of the central nervous system. Examination of the fundi failed to disclose any retinal hæmorrhages. A Rumpel-Leede test was negative.

**Laboratory findings.**—The hæmoglobin was 69.5% (10.3 gm.); R.B.C. 3.37 million per c.mm.; colour index 1.0; W.B.C. 34,600 per c.mm.; (Differential: polymorphs 73%, lymphs 16%, monos. 8%, rhab. 1%, metamyelocyte 1%, myelocyte 1%); platelets 68,448 per c.mm.; Bleeding time (Duke) 11 minutes 45 seconds, clotting

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time (Lee & White) blood incoagulable; Group "B", CDe/cde.

The blood urea was 77 mgm. per 100 ml., plasma protein 6.4 gm. (albumin 4.3 gm., globulin 2.1 gm., A/G ratio 2.1/1), cephalin-cholesterol flocculation negative, thymol turbidity 1.4 units, alkaline phosphatase 14.6 King-Armstrong units and cholesterol 260 mgm. per 100 ml. Throat swabs (taken after commencement of antibiotic therapy) revealed no pathogens. The anti-streptolysin-O titre was 1,200 units.

Urinalysis showed a sanguinous colour, albumin 4 plus, reduction and acetone tests negative, and microscopy revealed numerous granular casts, polymorphs and many red blood cells.

The coagulation defect was studied in detail and is described elsewhere.<sup>2</sup> There was complete absence of fibrinogen, decreased prothrombin concentration, slightly increased thrombin inhibitory activity, prothrombin accelerators appeared normal and increased fibrinolytic activity of the plasma could not be demonstrated.

The native plasma which was stored at refrigerator temperature as distinct from plasma kept at 37° C. was found to contain a precipitate. A similar precipitate was observed in the serum obtained after the first transfusion. Part of this precipitate could be dissolved by warming the plasma at 37° C. for half an hour. When the precipitate was then removed by centrifuging the remaining plasma contained a cryoglobulin which precipitated at 4° C. and redissolved at 37° C. The precipitate which had been removed was not soluble in distilled water nor NaCl and gave a positive xanthoprotein reaction with concentrated nitric acid and ammonium hydroxide. It was assumed to be a spontaneously precipitating protein.<sup>3</sup>

#### CLINICAL COURSE

During the first three weeks of observation the child was critically ill, running a high fever spiking up from 101 to 103° F. with a marked tachycardia. Sanguinous nasal discharge was profuse during the first two days, and the hæmorrhagic areas around the eyes and on the skin of the right cheek increased in size, accompanied by marked oedema of the face. Oedema of the scrotum and penis was present and the urine contained gross blood. Soon after admission swelling and bluish-black discoloration appeared on the dorsum of the left foot and similar patches were noted on the extensor surfaces of both forearms. The following day oedema of the right foot and leg was noted and within 3 days areas of hæmorrhagic discoloration of the dorsal surface of the feet and legs became extensive. The lesions on the legs, forearms and right cheek now showed an almost black discoloration and were associated with multiple hæmorrhagic bullæ (Figs. 2 and 3). The appearance suggested the development of local gangrene. The tissues of the calves were tense, swollen and discoloured. The areas of discoloration in the legs extended nearly to the knee level on the right and within 4 inches of the knee level on the left.

The treatment consisted essentially of parenteral crystalline penicillin, intravenous fluids, two attempted exchange transfusions in which only approximately 250 ml. of blood could be withdrawn, and simple transfusions of fresh blood and plasma. On March 7, 2,000 mgm. of fibrinogen was administered intravenously through the right saphenous vein. The laboratory findings during this period did not alter significantly. The hæmoglobin fluctuated between 50 and 75%, the prothrombin concentration remained low and liver function tests remained negative. The fibrinogen concentration did not reach normal levels until after the administration of fibrinogen. Blood cultures were negative throughout.

On March 9, a sudden onset of pain and further swelling occurred in the right leg which was thought possibly due to venous thrombosis of the saphenous vein as a result of the cannula which had been in place for several days. It was considered dangerous to administer anticoagulants and the right leg was elevated and treated

with ice packs. The clinical condition continued to be critical with high fever, marked tachycardia and by March 18 it was decided that amputation of both lower legs would be necessary to save his life. This was preceded by a further injection on March 18 of 2,000 mgm. of fibrinogen and on March 19, the right leg was amputated at the knee and the left leg four inches below the knee. Both wounds were incompletely closed and a penrose drain was inserted in the right stump.

The child's postoperative course was reasonably satisfactory and his general condition gradually improved with no further hæmorrhagic areas appearing. The gangrenous patches gradually separated and filled in with thick scar tissue. The temperature returned to normal by March 26 and from then on, except for minor elevations, remained satisfactory. The urinary findings gradually improved after the onset and the urine was clear towards the end of March. The boy was followed for a period of 18 months. He remained in good health and laboratory findings were normal at all times. Repeated fibrinogen estimations on the blood following the administration of fibrinogen showed normal values.

*Pathological findings.*—A biopsy was taken on March 9 from the lesion on the left arm, including also normal surrounding tissue and a piece of underlying triceps muscle. In addition the amputated extremities were examined, together with the bone marrow obtained from the right tibia.

Sections of the biopsy specimen showed increasing pathological changes of the epidermis as it approached the hæmorrhagic area. The changes varied from parakeratosis to complete necrosis with intra- and sub-epidermal vesicle formation. First the upper portion of the epidermis was seen to be necrotic and raised from the underlying portion by a number of small vesicles, the unaffected portion showing marked nuclear pyknosis and intracellular oedema. Towards the hæmorrhagic area the epidermis became more and more necrotic until the whole thickness was involved. In this area the formation of sub-epidermal bullæ was evident; these were filled with red cells and occasional leucocytes. The underlying dermis and subcutaneous tissue were intensely infiltrated by red blood cells and showed necrotic changes of the walls of small arteries and veins which in places were infiltrated by inflammatory cells. Some of these vessels were occluded by thrombi showing partial organization and recanalization, but there was also occlusion by a hyaline pink-staining material apparently constituting a platelet thrombus. The piece of triceps muscle was oedematous and showed markedly dilated blood vessels, a perivascular lymphocytic infiltration, and patchy loss of striation.

The right leg had been amputated through the knee joint and the left leg about three inches below the knee joint. Both legs showed similar appearances, sharp demarcation lines being present over the skin. Most of the skin showed a black discoloration, and there was extensive necrosis over large portions of the skin and subcutaneous tissue together with some extravasation of blood in the fascial planes. Further sectioning revealed extensive thrombus formation in the larger vessels.

Histological examination of the extremities showed necrosis of the major portion of the skin and subcutaneous tissue. The muscles showed partial transformation into a hyaline material together with smaller areas of preserved muscle tissue. In places there was a marked perivascular leucocytic infiltrate with occasional predominance of eosinophils. In others there was evidence of necrotising angitis in several of the smaller arteries and veins and widespread thrombus formation. The vascular occlusions were noted in all sizes of veins and in the smaller arteries and showed organized mixed thrombi as well as some hyaline eosinophilic thrombi in the smaller arteries and arterioles, some of the latter containing a number of leucocytes. Stains for fibrin were negative.

The tibial bone marrow was markedly cellular showing preponderance of the leucopoietic series with slight eosinophilia. Red cell precursors and megakaryocytes were plentiful.



## DISCUSSION

This syndrome has been described on many previous occasions with the exception of the fibrinopenia which has been observed only rarely.<sup>4, 5, 6</sup> It is of interest to note that except in a few instances<sup>7, 8</sup> the large majority of cases reported in the literature failed to disclose any significant histological findings.<sup>6, 9</sup> In the two above-mentioned cases<sup>7, 8</sup> hyaline thrombi have also been described, while leucocyte platelet thrombi have been noted in the Arthus and Schwartzman phenomena.<sup>10</sup> The very high anti-streptolysin-O titre would suggest an etiological rôle of the hæmolytic streptococcus.

The mechanism leading to the fibrinopenia in this case is uncertain, but it is of interest to speculate on the various possibilities, particularly in regard to the associated necrotising angiitis and thrombus formation. Fibrinopenia could occur either from a failure of formation at the site of origin of this protein substance, it could be destroyed by a fibrinolysin, or it could be consumed in the process of intravascular coagulation. The latter process has been studied in animals and in humans<sup>11, 12</sup> including our own laboratory, but its application in disease is not entirely proven.

It is emphasized that the platelets are located at the peripheral portion of concentric cylinders which comprise the formed elements of blood in motion,<sup>13</sup> thereby playing their fundamental rôle in hæmostasis. It is conceivable that sufficient thromboplastin is liberated by tissue damage incident to the antigen-antibody interaction to initiate clotting in the plasma column with the deposition of fibrin along vessel walls. On the other hand primary platelet deposition may occur along the injured endothelial surfaces resulting in platelet thrombi or in the initiation of clotting by disintegrating platelets. The occurrence of actual occlusion and the type of thrombus formed would probably depend on several factors such as the amount of clotting factor liberated, thrombus retarding factors, rates of blood flow, viscosity and "sludging". It has been suggested, for example, that under rapid conditions of blood flow pure platelet thrombi may occur; that at slower rates of blood flow the more numerous erythrocytes predominate, while in most cases there is formation of a mixed cell thrombus.<sup>14</sup> The significance of "sludging" is of interest in connection with the presence in the patient's plasma of cryoglobulins which have

been observed to cause "sludge" formation and thrombosis.<sup>15</sup>

Our assumption that intravascular platelet agglutination has occurred is consistent with the finding of a thrombocytopenia. Platelet deposition may well have given rise to the formation of thin fibrin films along vessel walls resulting in the consumption of fibrinogen. Although fibrin deposition could not be demonstrated in our case, this presumably could not be expected at the time our specimens were obtained. In this connection it is of interest to quote some of the findings in a case of purpura fulminans by McConnell and Weaver in 1922.<sup>7</sup> They found evidence of occlusion in several of the smaller portal vessels by masses of "granular fibrin" in which numerous mononuclear cells and a few leucocytes were enmeshed. Many of the capillaries in the brain showed "a distinct parietal mass of granular fibrin", the free lumen being filled with well preserved blood cells, whereas "in some the obstruction was almost complete". "Thrombi" were found in the smaller vessels of the bladder and intestinal wall, and some of the smaller vessels of the subcutaneous tissue were filled "by a mass of homogeneous material".

While the consumption of fibrinogen in the intravascular clotting process might be an important mechanism leading to the fibrinopenia, the rôle of fibrinolysis should not be overlooked. Antigen-antibody interaction has been shown to be accompanied by the formation of an active proteolytic enzyme,<sup>16</sup> likewise plasminogen can be activated by intracellular fibrinokinase.<sup>17</sup> *In vivo* fibrinolysis also occurs readily in association with intravascular fibrin deposits.<sup>11</sup> It would seem feasible therefore that both mechanisms have played a part in the disappearance of fibrinogen. However, since we were unable to demonstrate fibrinolysis *in vitro*, our findings would tend to support the first of the two mechanisms.

As to deficiency of fibrinogen formation, the only relevant feature from our findings is the fact that liver function tests were normal. Since the site of fibrinogen formation is not generally agreed upon, these findings may be of little value. The low prothrombin concentration found is also considered to be of equivocal significance.

The finding of a slight thrombin inhibitory activity associated with the occurrence of thrombosis deserves some comment. Anaphylactoid reactions are known to produce a thrombin in-

hibitory activity, and this may indeed be an important protective mechanism to counteract thrombosis, by preventing the clotting process and agglutination of platelets. It may explain why in most cases of purpura fulminans thrombotic lesions have not been present, as for example in the case described by Gasser<sup>9</sup> which was associated with a high thrombin inhibitory activity.

The fact that factor V deficiency,<sup>9</sup> fibrinopenia<sup>4, 5, 6</sup> and thrombin inhibitory activity of the plasma have been described in purpura fulminans indicates that several serious disturbances in the clotting mechanisms may be found, and does illustrate the complexity of pathological reactions involved in this disease.

Recovery from purpura fulminans is unusual. Only seven survivals out of over 100 cases have been reported. Two patients recovered after several large transfusions<sup>4, 6</sup> and the use of vitamin K<sup>6</sup>. A satisfactory result followed in another child after an exchange transfusion.<sup>9</sup> Two other cases have survived and methionine was given some credit in the therapeutic program.<sup>18</sup> Two additional children have recovered following amputation of the most seriously involved extremity.<sup>19, 20</sup>

In our case the true significance of the illness was not appreciated until its course was nearly run. Too great emphasis was placed on the fibrinopenia as a major etiological factor until it was realized that the fundamental condition was purpura fulminans. Our exchange transfusions were carried out with the object of providing adequate fibrinogen concentration. The majority of the fatal cases have succumbed within a few days after the onset, and the intensity of the process in its early phase with varying degrees of collapse seemed to be responsible for the fatal outcome. If treatment is to be effective the therapeutic measures must be promptly employed. An early recognition of the nature of the disease is essential and where facilities are available complete studies of the blood should be carried out to discover any defect of the blood coagulation.

Because of the nature of the disease, therapeutic measures cannot be more than supportive. They should consist of adequate quantities of fresh blood used either as a standard transfusion or as an exchange transfusion. Adequate antibiotic therapy should be administered where indicated. Where definite defects in the clotting

mechanism are found, appropriate measures should be employed. It was our impression that the fibrinopenia in our patient was not corrected by the blood transfusions, but only after fibrinogen was administered.

Striking clinical improvement has been reported in cases of allergic purpura following the use of cortisone.<sup>21</sup> It would seem theoretically desirable to employ adequate doses of ACTH or cortisone early in purpura fulminans in the hope of tiding the patient over the severe early phase and possibly lessening the tissue destruction. Skillful surgical therapy may be necessary as in this case to deal with seriously damaged extremities. It is to be hoped that early diagnosis and the use of ACTH and cortisone together with blood and other supportive measures may reduce the mortality and serious late effects of this tragic disease.

#### SUMMARY

A case of purpura fulminans associated with afibrinogenemia is reported. Recovery occurred following amputation of both legs. Histological findings revealed necrotising angitis with mixed and hyaline pink-staining thrombi, probably of platelet origin. The findings are discussed, and common features with the Arthus and Schwartzman phenomena are pointed out. It was felt that consumption of fibrinogen by intravascular coagulation may have played a part in the production of the fibrinopenia.

We are indebted to Dr. L. K. Diamond for his help and prompt provision of fibrinogen and the various members of the Moose Jaw Clinic for their considerable contribution in the management of this case.

#### REFERENCES

1. GLANZMANN, E.: *Jb. Kinderheilk*, 83: 271, 1916.
2. KENT, G.: *Proc. 4th Int. Cong. Int. Soc. Hemat.*, (in press).
3. LEPOW, H., RUBENSTEIN, L., WOLL, F. AND GREISMAN, H.: *Am. J. Med.*, 7: 310, 1949.
4. KNAUER, H.: *Jb. Kinderheilk*, 118: 1, 1928.
5. BRUEHL, H.: *Zeitschr. f. Kinderheilk*, 50: 547, 1931.
6. DYGGVE, H.: *Acta med. Scandinav.*, 127: 382, 1947.
7. MCCONNELL, G. AND WEAVER, H. L.: *J. A. M. A.*, 78: 165, 1922.
8. CHAMBERS, W. N., HOLYOKE, J. B. AND WILSON, R. F.: *New England J. Med.*, 247: 933, 1952.
9. GASSER, C. AND DE MURALT, G.: *Helv. paed. Acta*, 5: 364, 1950.
10. STETSON, C. A.: *J. Exper. Med.*, 94: 347, 1951.
11. SCHNEIDER, C. L.: *Surg., Gynec. & Obst.*, 92: 27, 1951.
12. RATNOFF, O. D. AND CONLEY, C. L.: *Bull. Johns Hopkins Hosp.*, 88: 414, 1951.
13. KNISELY, M. H., BLOCH, E. H., ELIOT, T. S. AND WARNER, L.: *Science*, 106: 431, 1947.
14. FLYNN, J. E.: *Blood Clotting and Allied Problems*, Jos. Macy Found., N.Y., 4th Confer., p. 36, 1951.
15. *Idem*: p. 40, 1951.
16. UNGAR, G. AND MIST, S. H.: *J. Exper. Med.*, 90: 39, 1949.
17. ASTRUP, T. AND PERSIN, P.: *Nature*, 159: 681, 1947.
18. KAUFMAN, B.: *Arch. Pediat.*, 63: 282, 1946.
19. DICK, G. F., MILLER, E. M. AND EDMONDSON, H.: *Am. J. Dis. Child.*, 47: 374, 1934.
20. WEBB, B. D., DUBS, E. J. AND CONRAD, E.: *J. Pediat.*, 30: 76, 1947.
21. KUGELMAN, I. N.: *New York State J. Med.*, 51: 2504, 1951.



## CONTROLLED HYPOTENSION TO REDUCE SURGICAL HÆMORRHAGE\*

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THE PROBLEM of hæmorrhage during surgery always has been of deep concern to surgeons and anæsthetists. Since the realization, during and after World War II, of the importance of adequate blood replacement, it has become even more important. Hæmorrhage during surgery has two consequences. Firstly, it may endanger the safety of the patient. Secondly, when small in itself, it can interfere with the successful performance of the surgery by obscuring the field of operation, and prolong the operative time by that required to control the hæmorrhage.

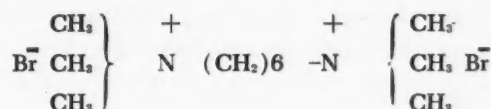
Hypotension, to a level where only arteries bleed, will control both types of dangerous or annoying hæmorrhage. This is achieved by providing a systolic pressure of 55 to 65.

Since 1948, Gillies of Edinburgh<sup>1</sup> has been using total spinal anæsthesia to produce this degree of hypotension for the control of surgical hæmorrhage. This necessitates spinal block to T.1 or about the level of the clavicle. Another method of hypotension reported by several writers<sup>2, 3</sup> is by arterial bleeding until the blood pressure falls to 60 to 80 mm. of Hg. The cannula is kept in the artery and the blood replaced by arterial transfusion at the end of operation, or before, if the systolic pressure falls below 60 mm. of Hg. A third method is by epidural anæsthesia, which acts in the same way as spinal block.<sup>4</sup> These methods of producing hypotension are all effective but so inherently dangerous that they have not been widely used.

With the introduction of the methonium compounds by Paton and Zaimus in 1949 as autonomic ganglionic blocking agents, a new field of investigation was opened. In the literature which immediately began to appear on these drugs for the treatment of hypertension and control of gastric secretion, postural hypotension was presented as an annoying side effect.<sup>13 to 17</sup> Enderby at East Grinstead<sup>5</sup> saw the possibility of adapting this to surgery and producing a safer hypotension than methods already in use. In June, 1950, he reported his first 50 cases using pentamethonium iodide and in

March, 1951, a further 250 cases with hexamethonium bromide. He considers the latter a more effective drug. Reporting on the use of both drugs, Shackleton<sup>7</sup> in May, 1951, with 250 cases, and Lewis in July, 1950, with 80 cases of thoracic surgery, agree that hexamethonium bromide is most constant in reducing blood pressure. Well over 1,000 cases have been recorded in the British literature.

The drug used in this series was "Vegolysen" brand of Hexamethonium bromide. It is one of a series of polymethylene bistrimethylammonium salts. The formula is:



The pharmacological properties are related to the number of carbon atoms in the polymethylene chain. C<sub>10</sub> or decamethonium has a curarizing action blocking the neuromuscular junction. C<sub>5</sub> and C<sub>6</sub>; pentamethonium and hexamethonium show a sharp maximum potency in ganglionic block. The site of action is at the preganglionic synapse of both sympathetic and parasympathetic nerves. There is, therefore, a block of the entire autonomic system. The effects are; mainly, generalized vasodilatation with postural hypotension. Given intravenously, in effective dosage, to an erect patient, the blood pressure would probably fall to zero. By placing him in a horizontal or slightly head-down tilt, it would as quickly return to 80 or 90 mm. of Hg. or higher. Other effects are dry mouth, blurring of vision from dilated pupils, occasional drowsiness and decreased motility of gut and bladder; 60 to 70% of the drug is excreted in the urine unchanged.<sup>11</sup> No chronic toxicity has been observed in laboratory animals even after prolonged administration of relatively large amounts of hexamethonium.

Hexamethonium acts by blocking the sympathetic supply to the vasoconstrictor mechanism. This makes it impossible for the body to compensate for blood loss either by hæmorrhage or into its own capillary reservoir.

"The vascular system in essence is composed of a pump and arterial conduit leading to a capillary reservoir and a return or venous conduit. The capillary reservoir which has a huge capacity in comparison to the total blood volume is capable of considerable variation in volume. If the reservoir were to enlarge to its full capacity, blood would be lost from the large conduits, whereas if it became smaller, an excessive amount of blood would be forced into the central circulation. If this closed system were static, blood loss would produce

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a fall in pressure throughout and a diminution of venous return. However, since the normal vascular system is dynamic, the capillary reservoir is capable within certain limits of reducing its capacity in proportion to the degree of blood loss. Thus the venous conduit remains filled and venous pressure and return are maintained. On this depends the extremely sensitive homeostatic mechanism of the vascular system.

"Certain hypotensive agents by doing away with the ability to reduce the volume of the capillary beds, convert the vasculature into a more static system, with the result that during blood loss the pressure falls throughout and venous return fails."<sup>25</sup>

When a patient is given an adequate dose of hexamethonium the blood pressure will fall, but not alarmingly if he is kept horizontal or slightly head-down. However, if the feet are lowered or the whole body placed in a foot-down slope, the blood pressure can be lowered almost proportionately to the degree of tilt. In effect the patient is bleeding into his own capillary reservoir where the blood may be safely kept until the end of the operation. It is then returned to his circulation by the simple expedient of raising the foot of the table and if necessary, using a slight head-down position. This may also be done at any time during the operation, so that a relatively complete control of blood pressure can be maintained.

In the normal patient, 500 c.c. or more of blood must be lost before any adverse effect is seen upon the blood pressure. However, using hexamethonium, should any degree of external hæmorrhage occur the body cannot compensate and the blood pressure falls further. Even a loss of 100 to 200 c.c. will show a decrement in blood pressure.

It cannot be emphasized too strongly that an essential part of this technique is the maintenance of constant blood volume. The only patients whose blood pressure did not rise promptly on changing position to a 5 or 10° Trendelenburg, were those whose blood replacement did not keep pace with the blood loss.

Consequently, therefore, it is apparent that the site of operation is important. Ideally, the surgical site should be the highest point in the body, while allowing for the legs, particularly, to be dependent. In this way the blood drains out of the operative area into the dilated vessels of the more dependent parts of the body. In addition to hypotension, there is also what Enderby calls "a postural ischæmia of the surgical site". The lateral jack-knife position of thoracic surgery is a typical example. This position can be exaggerated by raising the kidney bar and having the legs at a steep angle. In head and neck surgery,

the whole body can be placed in any desired degree of foot-down slope. Many other sites can be used by some thought and ingenuity in posturing.

The cases in this series have been:

Pneumonectomies .....	2
Lobectomies .....	5
Decortication of a lung .....	1
Thoracoplasties .....	18
Lumbodorsal sympathectomies .....	2
Craniotomies .....	3
Plastic surgery .....	4
<b>TOTAL</b>	<b>35</b>

#### TYPE OF INDIVIDUAL

Patients with hypertension react much more readily to hexamethonium and with a more profound hypotension than the normal group. Old age groups over 70 and known arteriosclerotics have so far been avoided. As with many drugs, the young, healthy adult requires a maximum dose and the elderly asthenic type a minimum. When in any doubt about the patient's reaction to the drug it can be given in small divided doses to obtain the desired effect. The minimum total dose has been 12.5 mgm. and the maximum 150 mgm. The initial dose used in the average vigorous, young adult is 50 mgm.

Anæsthesia has been produced with a combination of Pentothal, curare, intravenous Demerol, nitrous oxide and oxygen. Induction is with 0.5 gm. of Pentothal and 15 mgm. of curare. An endotracheal tube is then passed and anæsthesia maintained with nitrous oxide and oxygen usually four litres to two. If there is any question of the patient's oxygenation, the nitrous oxide is decreased or even discontinued. Many of the thoracic surgery patients have been carried on pure oxygen. The provision of adequate oxygenation is a fundamental principle in anæsthesia, even more essential when the blood pressure is low, for in this condition oxygen deficiency will strike with dreadful accuracy.<sup>26</sup> Pentothal and Demerol are used intravenously either in a continuous drip or in intermittent doses. Our most recent method is to use 25 mgm. of Demerol and 2 c.c. of 2.5% Pentothal, alternating at about 20 minutes interval for the first two hours. After that the intervals are lengthened to one-half hour or more. In this way an operation can be carried with very small amounts of anæsthetic agents. The average total for lobectomies and pneumonectomies was 1.2 gm. of Pentothal and 100 mgm. Demerol. Thoracoplasties used an



average total of 0.96 gm. Pentothal and 50 mgm. Demerol per case.

After being intubated, the patient is given an initial dose of hexamethonium and postured. A moderate foot-down tilt is tried and the degree of hypotension assessed in two or three minutes. An attempt is made to produce a systolic blood pressure of 55 to 65 mm. of Hg. This would seem to be the best range for maximum control of hæmorrhage with reasonable safety to the patient. Once stabilized, the blood pressure tends to remain at that level for one or more hours. Should it begin to rise a prolongation of effect can sometimes be had by increasing the degree of foot-down tilt. If this is not sufficient, a further dose of hexamethonium may be given. All these patients have been carried on controlled respiration which also assists in keeping the blood pressure low.<sup>23</sup>

Placing the table in a 5 or 10° Trendelenburg position at the end of the operation is usually sufficient to bring the blood pressure back to 90 or 100 mm. of Hg. We consider this a safe level for the patient to leave the operating room. However, the blood pressure is very labile for three to four hours and can be readily altered by raising or lowering the foot of the bed. The patient's condition must be closely observed during this postoperative period.

Complications in the operating room have been:

1. One case of auricular fibrillation. This was reversed in about 15 minutes with 5 c.c. 1% procaine intravenously and a 0.2% procaine intravenous drip for the remainder of the operation. The concentration of oxygen was increased by decreasing N<sub>2</sub>O and the blood pressure raised to 80 mm. Hg. by decreasing the tilt down of the legs. The patient was a malignant hypertensive having his second lumbodorsal sympathectomy under hypotension. The first had been uneventful. This was the only complication relating to the heart.

2. A severe bronchospasm in a known asthmatic undergoing pneumonectomy. This responded fairly well to intravenous aminophylline.

3. At the beginning of the series there were a few cases in which the blood pressure was slow to rise after the table had been put in 10° Trendelenburg. In the first case 6 mgm. of Methedrine was given intravenously without effect. At that point the estimation on blood loss was completed and it was evident that blood replacement had been inadequate. As soon as the blood loss was replaced the blood pressure came up promptly. Since that time a blood pressure that does not return to a reasonable level with horizontal or head-down position has been considered evidence of inadequate blood replacement. Again, this point cannot be too strongly stressed. It is of paramount importance to the technique to replace blood loss! The patient's vasomotor control having been abolished, the body very quickly reacts adversely to the loss of even small amounts of blood.

4. Inability to reduce the blood pressure sufficiently after giving hexamethonium and consequent danger of increasing bleeding due to vasodilatation. The effective dosage has proven so variable that it may be simply a

case of giving the drug until the desired effect is obtained. Some investigators claim that if an effect is not reached with 100 or 150 mgm. it is useless to give further drug. It may be due to insufficiently extreme posture. In one case, the blood pressure had not fallen below 90 mm. of Hg. in spite of 100 mgm. of Hexamethonium. By placing the patient in an almost upright position for a minute or two the blood pressure fell to a satisfactory level and remained there. Since that time this practice has been followed in the resistant cases with better results.

5. The greatest technical difficulty has been accurate recording of blood pressure at low levels. The auscultatory method sometimes fails because of weakness of the sound. Oscillometers have been tried but there is too much interference with movement about the table. We are now working on a direct method of recording intra-arterial pressure.<sup>25</sup>

Postoperative complications have been pleasingly few. Most of the patients have returned to consciousness as soon as or before similar types of operations with other anæsthetic techniques.

One patient had delayed recovery, not becoming fully conscious until seven hours postoperative. He was a man of 67 with advanced bronchogenic carcinoma, who had a pneumonectomy. It was a difficult case and in spite of a hypotension of 60 to 70 mm. of Hg. for the four hours of the operation, he lost 1,350 c.c. of blood. This was our single largest blood loss with Hexamethonium. His anæsthetic consisted of Pentothal 1.58 gm., Demerol 50 mgm. and curare 30 mgm. The only gas used was oxygen because of concern about his oxygenation. It was felt at the time that his delayed recovery must be due to cerebral anoxia. However, in discussing the case with one of the neurosurgeons the opinion was expressed "that a patient whose return to consciousness had been delayed six to seven hours by cerebral anoxia would tend to be confused and of slow cerebration for one or two days". As far as we could tell this was not the case; he appeared quite normal and alert as soon as he awakened.

Three patients in both control and Hexamethonium series had postoperative hæmorrhage with a considerable fall in Hb. (Fig. 1). An attempt has been made to analyze the pre- and post-operative hæmoglobin records in both groups, to assess if possible the relationship of postoperative bleeding. Up to a 14% fall in hæmoglobin occurred in 50% of the control and 62% of the hexamethonium. A fall of 15 to 29% in hæmoglobin occurred in 38% of the control and 24% of the hexamethonium group. Falls of 30 to 44% hæmoglobin occurred in 12% of the control and 14% of the hexamethonium group. There seems to be essentially little difference in

the two groups. Reports by other writers claim reactionary hæmorrhage as being rare.

One patient complained of severe low back pain after both his operations. This was probably due to his position on the table. Aside from this, the clinical impression is that these patients have felt particularly well postoperatively.

*Assessment of results* has been made easier because for the past two years in the Chest Unit at Shaughnessy Hospital blood loss in the operating room has been estimated by the gravi-

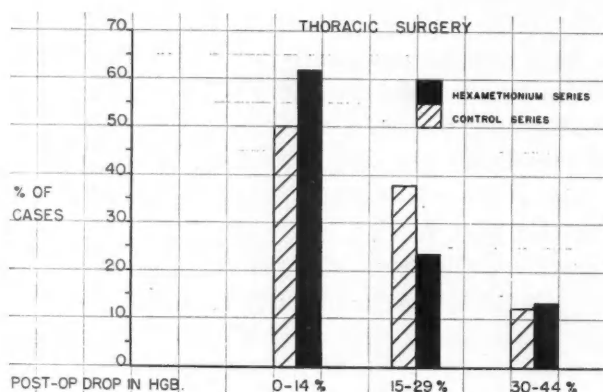


Fig. 1

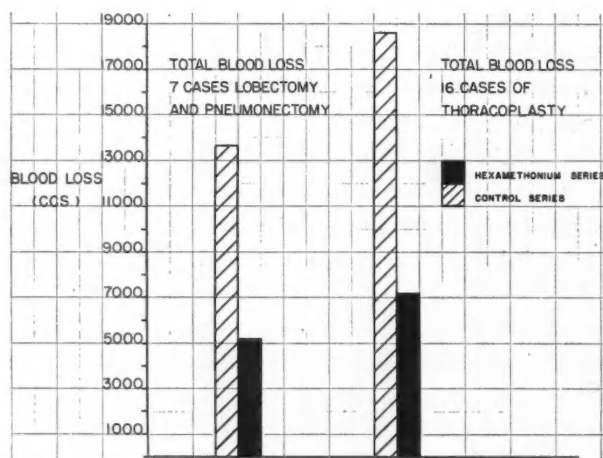


Fig. 2

metric method. All sponges, towels, gowns and other linen are weighed before sterilizing and the weight in grams marked on each piece. They are then used dry and weighed after use, each extra gram of weight being considered as 1 c.c. of blood loss. Sponges are weighed as the case progresses.

Fig. 2 shows the combined total amount of blood lost in seven cases of lobectomy and pneumonectomy. In the control it is 13,800 c.c. and in the hexamethonium group, 5,200 c.c. In 16 cases of thoracoplasty on the right, the control group lost a combined total of 18,625 c.c. and

the hexamethonium group 7,200 c.c. Fig. 3 shows the average blood loss per case. In the lobectomy group the average blood loss per case in the control was 1,850 c.c. and in the hexamethonium group 580 c.c. In the 16 thoracoplasties, the average blood loss per case in the control was 1,175 c.c. and in the hexamethonium group 420 c.c. In the thoracoplasties the control group had a range of blood loss from 650 to 1,950 c.c. and hexamethonium group from 200 to 1,050 c.c. In the lobectomies, the range in the control was 675 to 3,100 c.c., and in the hexamethonium group 150 to 1,350 c.c. This proves beyond doubt that it is possible to markedly reduce surgical hæmorrhage by this method. But a great deal of work needs to be done before we can be assured of the safety of the method and adopt it wholeheartedly. The patients must be selected carefully and watched

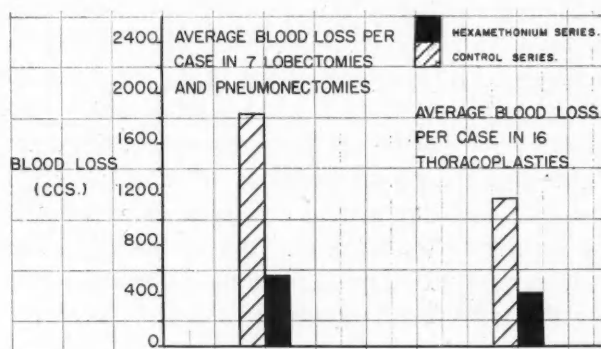


Fig. 3

with the greatest detail during the operation and in the immediate postoperative period.

A less dramatic result has been the reduction of operative time. The average time in the control group for lobectomies was 3.5 hours, and with hexamethonium 2.6 hours. For thoracoplasties the average time was reduced from 1.8 hours to 1.5 hours. For three craniotomies the average time was 2.06 hours. Postoperative urinalysis showed only an occasional trace of albumin and an occasional leucocyte or granular cast. The postoperative urinary output was not abnormal.

All the thoracic surgery cases had pre- and postoperative electrocardiograms, and seven cases had electrocardiograms during operation with hypotension. There was no evidence of coronary ischaemia or postoperative cardiac damage from anoxia.

In using a technique of this kind, which in so many ways is contrary to our accepted ideas on physiology, one would wish to have as much support as possible from current medical litera-



ture. In reviewing the available publications I was struck by how little work has been done on hypotension.

Gillies of Edinburgh claims that a systolic pressure of 60 mm. of Hg. will maintain a capillary circulation sufficient for cellular respiration and metabolism in all the vital organs provided the blood is well oxygenated and provided vasodilatation is assured.

Henry, Gauer and Kety writing on "Factors Maintaining Cerebral Circulation During Gravitational Stress" show that in various types of postural hypotension in the conscious patient the mean arterial pressure can fall to 30 mm. of Hg. before consciousness is seriously impaired, but that syncope develops at 20 to 25 mm. Hg. Mean arterial pressure was obtained by adding one-half pulse pressure to the diastolic pressure.

Kety and King<sup>19</sup> reporting on high selective spinal block in hypertensive patients, show that with a severe reduction in blood pressure, there is a significant reduction in cerebral blood flow and evidence of cerebral anoxia.

Hafkenschiel and Crumpton used dihydroergocornine as a sympatholytic drug in both hypertensive<sup>20</sup> and normotensive<sup>21</sup> patients. They record that in spite of a significant decrease in mean arterial pressure, the cerebral blood flow, cerebral arterio-venous oxygen difference and the cerebral oxygen uptake were essentially unchanged. This would agree with Gillies' statement that it is the vasodilator state that is important to the safety of the patient.

In the kidney hypotension has usually been associated with vasoconstriction as in shock from hæmorrhage or trauma. In fact a renal vasoconstrictor substance has been demonstrated in shock. There are reports of relief of the renal anoxic syndrome by splanchnic block or spinal anaesthesia.<sup>22</sup> This is corroboration of the vasoconstrictor factor in renal ischæmia and would support the theory of the safety in vasodilatation.

A severe fall in blood pressure can initiate an anginal attack in coronary heart disease and this is a definite contra-indication for hypotension. Dr. Douglas Robertson<sup>26</sup> has done electrocardiographic studies in normal and hypotensive states. In the small series which he has so far investigated, there has been no evidence of coronary ischæmia in either young or old patients when the pressure has been between 60 and 70 mm. Hg.

#### SUMMARY

A preliminary report has been made on 35 cases where hexamethonium bromide has been used to produce hypotension during anaesthesia.

The general control of blood pressure has been discussed and the importance of posture in the production of the hypotension. The importance of maintaining a constant blood volume has been stressed.

The assessment of results has shown a valuable reduction in blood loss during operation, by accurate measurement, and consequent reduction in operative time.

Nevertheless a note of caution must be again emphasized. "Controlled Hypotension" demands an adequate preoperative blood volume and the immediate replacement of all blood loss. At all times a patent airway and complete oxygenation are essential, with provision for expert and meticulous postoperative care. The contra-indications must be respected and it is not a technique to be employed by inexperienced or occasional anaesthetists. Even in the most skilled hands controlled hypotension should only be used in the presence of specific and urgent indications.

The writer is indebted to Dr. Barbara Kraft for valuable help with the cases presented and to Mr. W. L. Jeffrey of Poulenc Ltd., who supplied the drug used in the investigation.

#### REFERENCES

1. GILLIES, J.: *Proc. Roy. Soc.* 42: 295, 1949.
2. HALE, D.: *Anæsthesiology*, 9: 498, 1948.
3. BILSLAND, W. L.: *Anæsthesia*, 6: 20, 1951.
4. BROMAGE, P. R.: *Anæsthesia*, 6: 26, 1951.
5. ENDERBY, G. E. H.: *Lancet*, 1145, June 24, 1950.
6. *Idem*: *Lancet*, 663, March 24, 1950.
7. SHACKLETON, R. P. W.: *Brit. M. J.*, 1054, May 12, 1951.
8. LEWIS, I.: *Lancet*, 150, July 28, 1951.
9. PATON AND ZAIMIS: *Brit. J. Pharmacol.*, 4: 381, 1949.
10. FINNERTY, F. AND FREIS, E. D.: *Circulation*, 2: 828, 1950.
11. MILNE, G. E. AND OLEESKY, S.: *Lancet*, 1: 16, 1951.
12. CAMPBELL AND ROBERTSON: *Brit. M. J.*, 804, October 7, 1950.
13. TURNER, R.: *Lancet*, September 2, 1950.
14. HUNTER, R.: *Lancet*, 251, February 11, 1950.
15. BURT AND GRAHAM: *Brit. M. J.*, 455, February 25, 1950.
16. FINNERTY AND FREIS: *New England J. Med.*, 245: 325, 1951.
17. KAY AND SMITH: *Brit. M. J.*, 460, February 25, 1950.
18. GRAUER, H., KETY AND KRAMER: *J. Clin. Investigation*, 30: 292, 1951.
19. KETY, KING, et al.: *J. Clin. Investigation*, 29: 1450, 1950.
20. HAFKENSCHIEL, J. H., CRUMPTON, J., et al.: *J. Clin. Investigation*, 29: 40, 408, 1950.
21. HAFKENSCHIEL, J. H. AND CRUMPTON, J.: *J. Clin. Investigation*, 98: 145, 1950.
22. GABERMAN, P. AND ATLAS, D.: *Ann. Int. Med.*, 35: 1, 1951.
23. SARNOFF, MALONEY AND WHITLENBERG: *Ann. Surg.*, 132: 921, 1950.
24. FREIS, E. D., STANTON, J. R. AND FINNERTY, F. A.: *J. Clin. Investigation*, 30: 435, 1951.
25. PETERSEN, EATHER AND DRIPPS: *Ann. Surg.*, 131: 1, 1950.
26. Section on Anæsthetics: *Proc. Roy. Soc.*, 44: 829, 1951.

The last twenty years have seen a new interest develop in the cerebral palsies of childhood, largely as a result of the persistence with which Morgan Phelps and Earl Carson (both of the United States) have pressed for a re-examination of traditional views. The interest evoked is now international. Educationalists, sociologists and the medical profession have all shared in the trend.—W. S. Craig, *The Practitioner*, 171: 20, 1953.

## DIAGNOSTIC CLASSIFICATION AND RE-EDUCATION IN APHASIA

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THE LITERATURE concerning aphasia is not only voluminous but confusing, in respect to the nomenclature adopted and the numerous systems of classification proposed by various authorities over nearly a past century. Aphasic types have been defined according to anatomical, physiological and psychological characteristics, and even further systems have been devised attempting various combinations of these, which, rather than clarifying the position has only added to the confusion, and made understanding of the problem a major academic task. The present compendium is an attempt to simplify the problem of classification of aphasic types without distorting the facts, and thus to facilitate understanding of the disturbance so that more rational methods of therapy may be devised.

### CLASSIFICATION

Even to the present time no single system of classification is universally acceptable. Tradition, however, has preserved the terms motor and sensory, or as they are now better called, expressive and receptive, and on the basis of these two broad types a four-fold diagnostic grouping of aphasic types has been proposed and accepted with a certain amount of agreement.<sup>14</sup> The following classification is not only clinically meaningful, but is practical in its application, so that a speedy preliminary diagnosis of language disorder may be formed: (1) Predominantly expressive aphasia. (2) Predominantly receptive aphasia. (3) Expressive-receptive (mixed) aphasia. (4) Amnesic aphasia.

In referring to the classical literature one finds that many older workers postulated "pure" types of aphasic disturbance, pure, that is, in the sense that one and only one language function is disturbed. Modern and more accurate methods of testing, however, demonstrate clearly that few if any aphasias are pure in this sense. The disorders are usually only *predominantly* expressive or receptive, and other language abilities are always more or less disturbed. One language function may, however, be more impaired than

another so that the disorder takes on an outstanding feature. For this reason it is proposed that the term "predominantly" be used, and in this way cases of aphasia may be classified according to the outstanding characteristics of the disturbance.

Space does not permit a detailed description of each type, but for the sake of clarification it would be in order to describe typical features of each group:

(a) *Expressive aphasia* is characterized by an obvious difficulty in the articulation of sounds and words. The patient is fully aware of what he wishes to express but he has difficulty in the executive act of speaking or of writing as the case may be. This difficulty is apraxic in nature, and is to be clearly distinguished from dysarthria. The latter condition is due to paralysis of the muscles concerned and is constant, but an apraxic disturbance is not constant nor is it due to paralysis as such. The patient may be unable to articulate a sound or a word at one moment and yet is quite able to articulate at the next moment. He is unable to utilize the motor power for language purposes but is quite able to use the same muscles for non-language skills such as eating, or to carry out any other non-language acts. Furthermore, the expressive aphasic always recognizes his errors and usually tries to correct them. In being aware of his errors he is usually disturbed and anxious, and in trying to correct them he makes trial and error attempts at the word until he achieves the correct response. His need to communicate is great and he will often resort to the omission of unimportant words from a sentence in order to convey the main idea. This gives rise to the typical "telegramic" style or abbreviated sentence structure so characteristic of the condition.

Another interesting feature is that errors in written expression often parallel those in verbal expression. Reference to Fig. 1 demonstrates an expressive aphasic's attempt to print the word "revolver". It is interesting to note the omission of letters within the word in writing in much the same way as the patient would omit various sounds from words in speaking. The numerous trial and error attempts in writing before the correct response is achieved is identical with the trial and error attempts in speech to say the word. Likewise, it will be noted that the form of the letter "V" is confused with "Y" in writing in just the same way as such patients will

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confuse the articulation of one sound with another that approximates it in speech.

Reference to Fig. 2 illustrates the same type of errors in the patient's attempts to print the word "spoon". Observe the confusion of the letter "U" with the correct response "OO" and the difficulty in forming the letter "N" which is continually confused with the form "H". It should be pointed out that the wrong sounds used in speech or the wrong letters used in writing are frequently in the same "sphere" as the correct sound or letter.

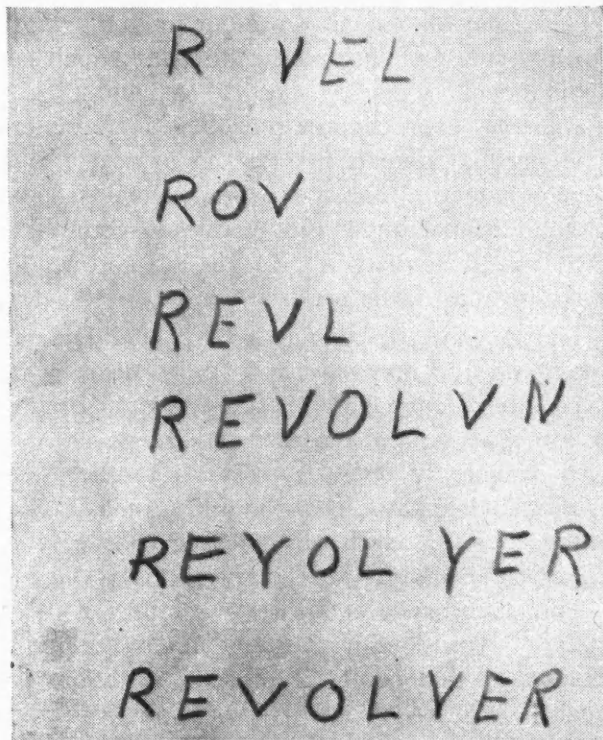


Fig. 1.—Illustrating typical expressive aphasic errors in writing.

In the next example the patient was required to write "this month is September", but his response is characteristic of the "telegraphic" style in writing just as it occurs in speech. He is aware of his error however and makes numerous trial and error attempts before the missing word is included.

(b) *Receptive aphasia* is largely a subjective disorder in that the patient is predominantly impaired in his ability to comprehend the spoken or the printed word. Not at all infrequently, however, he may too be seriously limited in his expression so that the term predominantly receptive loses its logical significance. The character of the expressive disorder in receptive aphasia however must be differentiated from the expres-

sive difficulties in predominantly expressive aphasia. Patients of the receptive group, unlike those of the expressive group, have little or no difficulty in the actual articulation of sounds or words. They are limited in expression because of a more subjective disturbance in the process

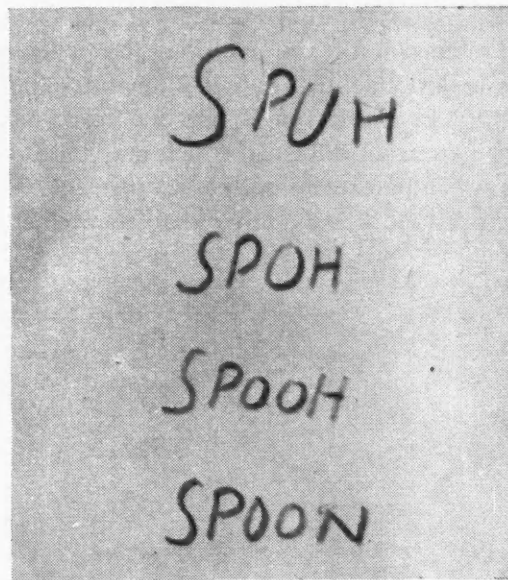


Fig. 2.—Illustrating typical expressive aphasic errors in writing.

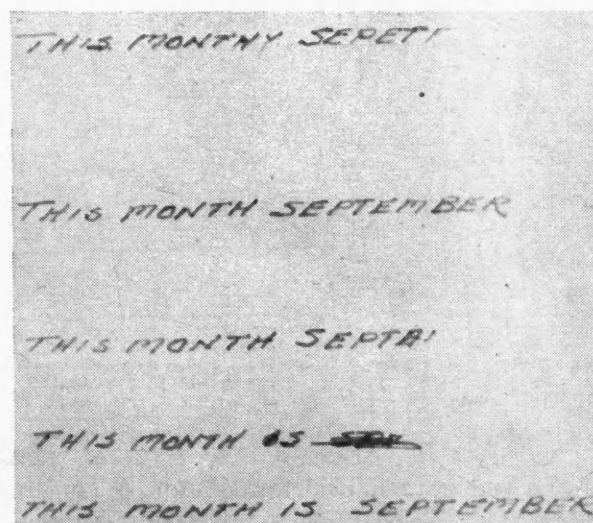


Fig. 3.—Illustrating typical "telegraphic" style in written expression, and trial and error attempts before correction is achieved.

from the level of abstract thought to speech. Rather than attempting the correct word and mutilating it because of an articulatory difficulty, they place sounds in the wrong order within words, use the wrong words, and place the words in the wrong order within sentences. The total result is that speech loses its propositional value and becomes jargon.

Furthermore, unlike the expressive aphasic, receptive aphasics do not usually recognize their errors nor do they attempt to correct them. What speech emerges is usually free of struggle and effort, and may in fact be plentiful, but it is largely incomprehensible. Ask the patient to repeat orally after the examiner, or to read from printed material, and although he may have no comprehension of the material, he will speak more or less fluently. This demonstrates that his difficulty in expression is not due to an articulatory (apraxic) difficulty which may be thought of as a comparatively peripheral disorder, but is due to a more subjective disturbance in the

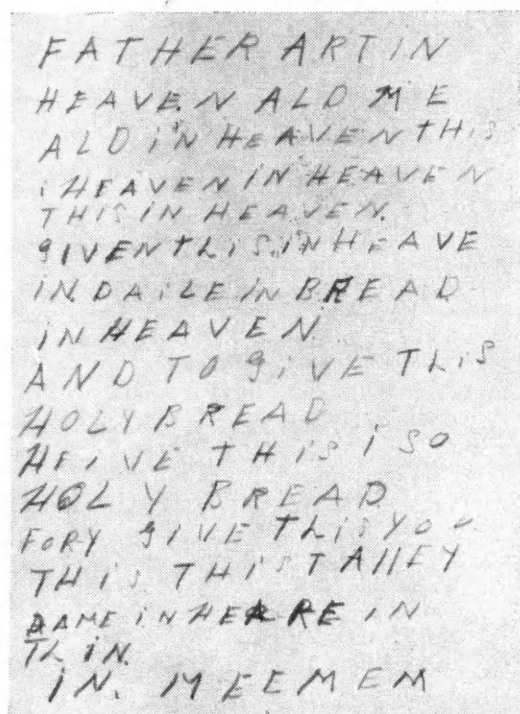


Fig. 4.—Illustrating typical errors in written expression of predominantly receptive aphasia as opposed to the type of errors made in predominantly expressive aphasia.

thought-speech process at the level of word choice and grammatical formulation. When this material is prepared for him as it is in oral reading, his real difficulty is circumvented temporarily until he is required to form propositional speech of his own accord.

Reference to Fig. 4 illustrates a receptive aphasic's difficulty in written expression when required to print the Lord's Prayer. It is interesting to note the perseveration of "in Heaven", also the omission of "our" before "Father" and "who" afterwards. Typically the phrase "hallowed be" is mutilated to "ald me" while "give us this day our daily bread" is expressed as "given this

in Heave in daile in bread". The word "temptation" is reduced to "dame" and "amen" is expressed as "memen". Much the same mutilation occurs in propositional speech as occurs in written expression. There is seldom evidence of recognition or reaction to errors made.

(c) *Expressive-receptive or mixed aphasia* is distinguished from the other groups because of the severity and extent of language disturbance. In these cases, all language abilities, both expressive and receptive, are equally and seriously impaired so that one function cannot be held to be superior to another function. Conditions such as this may of course represent only the most severe phases of an aphasic disorder which, as spontaneous recovery occurs, becomes predominantly expressive or receptive in character. The residual defects may be so extensive and severe however that the patient remains completely incapacitated and unable to communicate except perhaps by means of gesture to make his most basic needs known.

(d) *Amnesic aphasia* is a fairly well-defined syndrome, and may exist as a "pure" disorder in that other language functions remain unimpaired. This type of disorder may, however, and very frequently does, co-exist with expressive or receptive aphasia, but is more frequent in the latter condition and may in fact constitute a major concomitant of receptive aphasia.

The disturbance comprises essentially a difficulty in word-finding. Usually nouns are most affected so that names of objects, conditions or qualities are not evoked with normal ease and rapidity. Quite frequently, in comparatively mild cases, the patient succeeds in "masking" his difficulty by the adoption of such devices as word substitutions and circumlocutions. If he cannot recall the word "pen" for example, he will say "A thing that you write with". A feature of "pure" amnesic aphasia is that the patient always recognizes the correct word when it is produced either by himself or by another person. The percentage of correct recognitions in "pure" amnesic aphasia is much higher than the percentage of correct recognitions when the condition is co-existent with receptive aphasia. A further outstanding feature is the superiority of "automatic" speech responses in this condition. The patient may not, for example, be able to recall the name of the fourth day of the week but allow him to run through the automatic series, Sunday, Monday, Tuesday, Wednesday,



etc., and he will recognize the correct word immediately. Just as immediately, however, he forgets it again. The difficulty in evoking nouns may be so great that propositional speech is largely destroyed and the patient may be severely limited in verbal or written expression, solely because of this factor.

**Localization.**—It is not the purpose of this paper, nor it is strictly within the function of the writer, to discuss the question of cerebral localization in aphasia, except in so far as is necessary with reference to discussion of the diagnostic group offered above. Localization of cortical function especially with regard to aphasia has been a source of great controversy for many years. Three broad schools of thought exist to the present day. One school adopts a view of strict localization and is represented by Henschen<sup>8</sup> and, in more recent times by Neilson,<sup>11</sup> while the directly opposed school of thought, the "nonlocalizationists" are perhaps represented by Jackson,<sup>9</sup> and in more recent times by Goldstein.<sup>5</sup> Most modern neurologists, however, adopt a more moderate view, believing in specialization of function, but also realizing that the cortex operates as a whole in integrating language functions. This more moderate view is perhaps well represented by Weisenburg and McBride<sup>14</sup> who in an extensive study of 60 clear-cut aphasic cases utilizing the above four-fold system of classification were able to state that:

"In about 95% of the cases the lesion must be in the dominant hemisphere; and that it must implicate the anterior and to a less extent the posterior part of the brain within certain limits, including the lower portion of the precentral convolution and probably the adjoining part of the frontal lobe, the lower portion of the parietal lobe, the upper part of the temporal lobe, and the anterior part of the occipital."

Further, they state; "In the expressive group the lesion is mostly in the anterior zone; in the receptive there is relatively greater implication of the posterior area; and in the expressive-receptive group anterior and posterior areas are more likely to be fairly equally involved. The lesion in the amnesic type is less definite but may implicate most of one hemisphere unequally."

Another study carried out by Schiller at the Nuffield Department of Surgery, Oxford,<sup>13</sup> involving 46 cases allowed the following conclusions to be drawn relating to localization.

"In all cases with true aphasia there was difficulty in word-finding (nominal aphasia) regardless of the site of the lesion within the speech area. Frontal lesions tended to impair most the speaker's initiative, the speed of his enunciation, the articulation of his words, and the inflection of his voice. Temporal lesions hampered the understanding of spoken language, both of what the patient was saying and what was said to him. The struc-

ture and interpretation of words and sentences suffered (paraphasia, jargon and agrammatism) by the loss of auditory control on a high level. Posterior-temporal and temporo-parietal lesions interfered mainly with the interpretation of visual symbols of speech (reading and writing). Parietal lesions in particular caused a disturbance of all those faculties related to orientation in space and appreciation of shape; the pattern of the word or proposition to be said, read or written became distorted. Stammer and perseveration were also common. Lesions of the Sylvian area were the most deleterious to the more highly organized intellectual aspects of speech function. The bulk of the brain tissue destroyed was proportional to the severity and extent of the disorder involving both speech and intelligence."

#### THERAPEUTIC CONSIDERATIONS

Definite consideration must of course be given to the aphasic patient's actual speech and language deficiencies, and modern methods of speech therapy have developed special techniques designed to give the maximum assistance in this regard. An important facet of the aphasic problem, however, which has not perhaps received due consideration except by speech specialists actively engaged in therapy is the patient's psychological reactions to his organic impairment. We readily agree with the statement that, "an aphasic is essentially an individual struggling to readapt himself to the havoc wrought in those parts of the dominant hemisphere which surround the Sylvian fissure."<sup>13</sup>

Perhaps we do not always sufficiently realize how very disturbed a patient must be whose means of communication have been impaired and who yet has not deteriorated in general intelligence, but remains fully sensitive to his limitations. Unfortunately it is not yet fully realized that aphasia *per se* does not imply general mental deterioration, and that the patient is frequently as intelligent as ever he was in non-language activities. Certainly it has now been shown without doubt that aphasics can and do relearn language skills, but too often the process is left to "spontaneous" recovery and nothing active in the form of direct speech therapy is attempted.

There can be no doubt of course that during the stage of primary recovery, with subsiding oedema, a degree of spontaneous improvement in language functions may take place, but it is equally evident that this improvement does not occur within a vacuum. It is obvious that the process is affected by the patient's environment, by the stimulation he receives, which according to its nature may have a beneficial or detrimental effect upon the patient's recovery, especially upon his language recovery. We can hardly

disagree with the author<sup>15</sup> who states, "It is evident therefore that the aphasic is an individual exhibiting both external and internal needs with definable problems both in the soma and the psyche". Experience has shown that whenever feasible it is good therapeutic practice to give the patient insight into the nature and extent of his impairment so that he may be aware of his limitations in the language area and able to maintain his aspirations at a realistic level. Thus we may reduce unnecessary frustration and anxiety which is such a detrimental factor to progress.

Of no less importance in the therapeutic program is the education of the immediate family whose co-operation must be obtained. This is especially so where the family constellation reacts to the patient's limitations with frank hostility or by an over-protective attitude. This is not an infrequent occurrence when the aphasic disturbance is not correctly understood and is thought of as a general mental deterioration. Often well intentioned but misguided efforts made to assist the patient prove to be a real detriment because demands are made of him at such a level that it is impossible for him to respond adequately. The result can only be further withdrawal and isolation of the patient and reluctance to attempt to fulfill a useful rôle in society.

Few set rules can be laid down; each case is an individual problem but there is probably no type of disorder in which it is more important to gain an exact evaluation of the level of impairment because no rational re-education or therapeutic program can be formulated until such an assessment has been made in the individual case. It must be clearly established whether specific agnosias or apraxias are present, and what modalities of communication are still intact in order to provide avenues for purposes of therapeutic entry. Only too often aphasic patients are approached at quite the wrong level, in quite the wrong way, and of course no satisfactory result is achieved. To administer articulatory drills, for example, to a patient who is limited in expression not because of apraxia or dysarthria is futile when his impairment in expression is at an altogether more subjective level in the thought-speech process. Such a patient may require instead assistance in word-finding, or in re-learning the techniques of sentence-structure and grammatical form.

Articulatory drills have their place of course where the disorder in expression is due to an articulatory defect, but all impairment in verbal expression is not by any means due to impairment of the peripheral organs, other processes are often involved. Similarly it is futile to approach the patient on an auditory basis if that function is seriously impaired and other receptive avenues are relatively superior, and yet this is common practice of relatives and others who are ill informed of the nature of the patient's disorder.

It is not the purpose of this paper to describe the techniques of speech therapy, but an adequately trained speech therapist has a background of study in speech pathology concerning the neurophysiological, anatomical and psychological aspects of speech and language which enables him to form a reliable diagnosis of speech disturbance upon the basis of which the best therapeutics may be formulated to meet the special needs of the individual case. The speech clinician is primarily interested in what speech and language functions still remain relatively unimpaired so that through these avenues by virtue of his special skills and techniques he may best assist the patient to improve performance in use of the impaired functions.

The earlier this assistance is given the better, as many controlled studies have shown that speech therapy has its best effects in extending and hastening the recovery process if commenced within the first six months of the post-traumatic period. This may mean, of course, that some patients receive therapy who would have made entire spontaneous recovery, but it is felt that beginning therapy with such patients is not at all a serious error. Experience has shown that therapy is most effective when it involves the patient entering into real life situations, so attempts are made in modern therapy to adjustment of the total person in order that he may learn to resume as near normal life as possible before the only too frequent occurrence of "vegetation" sets in.

We agree entirely with the statement that, "The very nature and evolution of speech is such that it is not merely a system of symbols to convey ideas and emotions, but has been primarily developed as an instrument for man's actions and intercourse in society."<sup>12</sup> Too frequently the aphasic patient receives the best of



physical care only to live an extended but isolated and demoralizing existence, prevented, as he is, from re-establishing himself as a useful member of society.

It will be recognized that the writer is heavily indebted to many workers in the field, both past and present, and individual acknowledgments to all sources of information are too numerous to be made. Nevertheless, an attempt has been made to provide a comprehensive, yet not too detailed bibliography so that readers particularly interested in the subject may refer to the original studies.

#### BIBLIOGRAPHY

1. BASTIAN, H. D.: The Brain as an Organ of the Mind, Paul, Trench, Truber & Co., 1880.
2. BERRY, J. A.: Brain and Mind, Macmillan Co., N.Y., 1928.
3. BROCA, P.: Remarques Sur Le Siege De La Faculte Du Langage Articule Suive D'une Observation D'apheme, Buletine Societe Anatomique De Paris XXXVI, 1861.

4. BUTFIELD, E. AND ZANGWILL, O.: *J. Neurol., Neurosurg. & Psychiat.*, 9: (New Series) No. 2, 1946.
5. GOLDSTEIN, K.: After Effects of Brain Injuries in War, Grune & Stratton, New York, 1932.
6. GOWERS, W. R.: Diseases of the Brain, J. & A. Churchill Ltd., London, 1885.
7. HEAD, H.: Aphasia and Kindred Disorders of Speech, Macmillan, New York, 1926.
8. HENSCHEN, S. E.: Klinische und Anatomische Beitrage Zur Pathologie Des Gehirns, Stockholm, Nordiska Bokhan Deln, 1920-22.
9. JACKSON, J. H.: Selected Writings of, Edited by James Taylor, Hodder & Stoughton, London, 1932.
10. MARIE, P.: *Presse Med.*, 30: 177, 1932.
11. NIELSEN, J. N.: Agnosia, Apraxia, Aphasia, Paul B. Hoeber, New York, 1946.
12. PICK, A.: Studien Uber Motorische Apraxie, Leipzig & Wein: Franz Deuticke, 1905 and Thiele, R. Aphasie. Handb. Norm. U. Path. Physiol., 15. Julius Springer, Berlin, 1931.
13. SCHILLER, F.: *J. Neurol., Neuropsychiat. & Psychiat.*, 10: (New Series) No. 4, 1947.
14. WEISENBURG, T. AND MCBRIDE, K. E.: Aphasia, The Commonwealth Fund, New York, 1935.
15. WEPMAN, J. M.: Recovery from Aphasia, The Ronald Press Co., New York, 1951.
16. WERNICKE, C.: Der Aphasische Symptomencomplex, Breslau, 1874.

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### OPTIMAL AGES FOR ELECTIVE SURGERY IN INFANTS AND CHILDREN\*

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MANY CONGENITAL ANOMALIES amenable to surgery, while not incompatible with life may seriously handicap the development and growth of the child if allowed to remain uncorrected. Surgery in these cases is elective, and depending upon the nature of the lesion, is best performed at certain ages. A knowledge of the optimal age for the correction of the lesions most commonly encountered in general and pædiatric practice is of great value to the physician, since needless premature surgical referrals and prolongations of watchful waiting beyond the optimal time may be avoided. This paper briefly reviews these conditions, and presents the opinions of surgeons<sup>1 to 5</sup> on the staff of the Boston Children's Hospital as to the optimal age and procedure of choice for their surgical corrections.

In Table I are summarized the optimal ages for elective surgery, and the operative procedures of choice for the more commonly encountered non-acute surgical lesions of children.

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**Harelip.**—One of the most distressing and frequent congenital anomalies is harelip with or without associated cleft palate. Because these babies frequently cannot suck and because sucking would interfere with the postoperative healing of the lip, all feedings must be given by means of a syringe feeder, to which is attached a short piece of rubber tubing in place of a nipple. The upright position during feeding minimizes regurgitation through the nose.

The optimal time for the surgical repair of a harelip is from four to six weeks of age when the baby is well adjusted to his feedings and is gaining weight. The operative management depends upon the type of defect present—whether it be complete, or incomplete, unilateral or bilateral, or any combination of these.

Following operation, syringe feedings are continued for two to three months. If the baby does not have an associated cleft palate, regular bottle feedings may be commenced, but if there is a palatal defect, the patient should be continued with the feeder until he can be trained to take feedings from a cup and a spoon.

**Cleft palate.**—Cleft palate repair should be deferred until the child is sixteen months to two years of age. Prior to that age, the mouth is usually too small for adequate operative exposure, and yet it is our belief that the palatal repair should be carried out before the child learns to talk. Grabar<sup>6</sup> recently has advocated delaying repair at least until after the fourth year as lateral growth of the maxillary denture may be interfered with by surgery. In our experience of

over 100 cleft palates repaired per year, maxillary bone growth has rarely been disturbed by properly performed staphylorrhaphy. In the majority of cases, extensive freeing of lateral muco-periosteal flaps with suturing (modified Langenbeck<sup>7</sup> repair) gives a very satisfactory result. In the few cases with very short palates, a one-stage, push-back procedure,<sup>8</sup> or a V-Y lengthening is recommended. Children under-

TABLE I.

OPTIMAL AGES FOR ELECTIVE SURGICAL PROCEDURES  
IN FREQUENTLY ENCOUNTERED LESIONS OF INFANTS AND  
CHILDREN

Lesion	Operative procedure	Optimal age for surgery
Harelip	Cheiloplasty	4 to 6 weeks
Cleft palate	Palatoplasty	18 to 24 months
Dermoid cyst	Excision	Any age, preferably after 6 months.
Lop ears	Plastic correction	5 to 6 years
Supernumerary ear tabs	Excision	Any age
Preauricular sinus	Excision	After one year
Branchial cyst and sinus	Excision	After one year
Thyroglossal cyst and sinus	Excision	After one year
Cystic hygroma	Excision	Soon as noticed
Patent ductus	Division	3 to 8 years
Tetralogy of Fallot	Pulmonary-aortic anastomosis	3 to 10 years
Coarctation	Excision and aortic anastomosis	After 9 years
Umbilical hernia	Umbilical herniorrhaphy	After one year
Inguinal hernia	Inguinal herniorrhaphy	Any age
Hydrocele	Excision	After one year
Undescended testicle	Orchidopexy	9 to 10 years
Hypospadias	Correction of chordee	3 to 4 years
	Construction of urethra	10 to 12 years
Exstrophy of bladder	Bilat. uretero-sigmoidostomy	2 to 4 years
	Excision of bladder	4 to 5 years
Webbed fingers	Plastic repair	3 to 5 years
Supernumerary digits	Excision	After 2 years
Hæmangiomas	Roentgen therapy	Any age
Pigmented nevi	Excision	2 to 6 years

going palatal repair must be in good physical condition and free from respiratory disease, else infection resulting in wound breakdown is likely to occur. Postoperative speech training is necessary to a greater or lesser degree in all patients. It can usually be done at home by the mother under guidance of either a speech therapist or the plastic surgeon.

**Dermoid cysts.**—Dermoid cysts commonly occur in the midline of the nose, and in the

lateral forehead region particularly the eyebrow. Surgical excision may be performed at any age, but is probably best delayed until the infant has reached six months. Before excision, roentgenograms of the skull should be taken to rule out a bony defect and possible intracranial extension of the cyst.

**Lop ears.**—Except when the ears are exceptionally prominent, girls with lop ears do not require surgical correction since their hair will cover the deformity. In boys, however, the ears may be so conspicuous that serious personality changes occur as the result of teasing by playmates at school. In these children, plastic correction of the lop ears should be done at the age of five or six years; before they attend school, and yet old enough for them to co-operate during their convalescence. Both sides are done at one operation; the technique used has been described by MacCollum.<sup>9</sup>

**Supernumerary ear tabs.**—Small tabs which usually contain cartilage may be safely excised at any age.

**Pre-auricular sinuses.**—Small sinuses situated just anterior to the tragus of the ear are very common. Surgical advice regarding these sinuses is not usually sought until infection occurs, as it invariably does in those sinuses that penetrate deeply. The infection will not be cured until the sinus tract is completely eradicated. This is best done by unroofing the whole area and by excising and curetting out all tracts and chronic inflammatory tissue. The wound is then packed with gauze and allowed to granulate in slowly. Sinuses which are not infected may be so shallow as never to cause disfigurement or trouble. These can be left alone. Others which are deeper and likely to become infected can be excised completely and their wounds primarily closed.

**Branchial cleft sinuses and cysts.**—Branchial cleft sinuses, fistulæ, or cysts are embryonic remnants presumably derived from the second and third branchial clefts. They appear along the anterior border of the sternocleido-mastoid muscle and course posteriorly, medially, and slightly upward between the bifurcation of the carotid artery to the pyriform fossa at the base of the tonsil. Since they are so apt to become infected in time, it is best to remove all of them. However, if infection is not troublesome, excision is best delayed until the child is over one year of age, since in the infant exposure is poor and the



fistulous tract is so delicately thin as to frequently make its complete dissection difficult.

*Thyroglossal cysts and sinuses.*—These occur in the midline of the neck, usually just below the hyoid bone. Like branchial derivatives, they also are prone to infection, and ideally are best excised before sepsis supervenes. As with branchial sinuses, we prefer to delay surgical excision of thyroglossal cysts or sinuses until one or two years of life. If recurrences after excision are to be avoided, the tract must be completely removed back to the foramen cæcum at the base of the tongue. Since the tract passes through or adjacent to the hyoid bone, we routinely excise the midportion of this bone along with the tract. If infection is already present, it should be treated with chemotherapy and possibly simple drainage with subsequent excision of the tract when the infection is quiescent.

*Cystic hygromas.*—Hygromas are cystic and usually are multilocular dilatations of embryonic lymph channel remnants which commonly occur in the neck, occasionally in the axilla, or still more rarely in the groin. They may, however, occur in many parts of the body. Hygromas are usually noted shortly after birth and gradually increase in size. Hæmorrhage may occur into the cysts, however, and the rapid enlargement which results may seriously jeopardize respiration by pressure upon the trachea. The treatment of choice is surgical excision as soon as the condition is recognized. Because of the possibility of intrathoracic extension as reported by Gross and Hurwitt,<sup>10</sup> a Roentgenogram of the chest should be obtained before undertaking the excision of cervical, extrathoracic or axillary hygromas. In some instances the lesion may surround vital structures (*e.g.*, carotid artery, vagus nerve, or trachea) and may be so extensive that complete removal is impossible even if the operation is performed in stages. When such is the case, cystic remnants should be ruptured, their lining treated with sclerosing solution, and the wound drained. X-ray therapy is of little value in the treatment of this condition. One should always be hesitant in promising a permanent cure, since small islands of hygroma may be left behind and frequently result in recurrence.

*Patent ductus arteriosus.*—The diagnosis of patent ductus is not usually made until after the first year of life, since the typical continuous machinery-like murmur does not usually become

apparent until after that time. Depending largely upon the size of the ductus, the child may or may not have symptoms. Because all these children run the risk of being physically retarded, of contracting subacute bacterial endocarditis, of developing pulmonary vascular disease, or of going into heart failure, we now believe that all children having a persistent patent ductus should have surgical closure of the ductus performed. In Gross's<sup>11</sup> large series of cases, the operative mortality for division of the ductus in uncomplicated cases is under 0.5%. The optimal age for surgery is from three to eight years. Children of this age make a quick and satisfactory recovery following operation. We now allow them up and out of bed on the second or third post-operative day, and they are usually discharged from the hospital on the seventh to tenth day.

Occasionally, serious symptoms due to a patent ductus may develop during infancy. If a continuous murmur is present no great difficulty usually is encountered in making the diagnosis, but frequently the murmur is systolic only or is otherwise atypical. In such cases, retrograde aortography best performed by injecting the radio-opaque dye into the left carotid artery, is required to establish the diagnosis. Surgical division of the patent ductus in these seriously ill infants should be performed as soon as the diagnosis can be made.

*Tetralogy of Fallot.*—This is the most frequently encountered condition present in children with cyanotic heart disease. The degree of cyanosis and limitation of activity in these patients varies greatly; they depend upon reduced flow of blood to the lungs and also upon the amount of venous blood being shunted through the interventricular septal defect into the overriding aorta. Because of hæmoconcentration, great care must be taken at all times to guard against dehydration in these children, else thrombosis (particularly cerebral) is likely to occur. The surgical treatment of these blue babies produces a marked improvement, but is by no means curative.

When one is forced to operate early because of the severe nature of disease, the mortality rate is very high—indeed, amounting to 25 or 30%. This high mortality is accounted for not only because of the poor risk patient, but because of the difficulty of working with small vessels, and their tendency to thrombose at the site of the shunt after its establishment. Beyond

three years of age, the mortality is between 5 and 10%. Therefore, whenever possible, it is preferable to avoid operation in the first two or three years of life and defer it until an older age when the risks of surgery are less and the promises of a satisfactory result are brighter. In general, the surgical approach is through the left chest. We prefer to perform a Potts-Smith-Gibson<sup>12</sup> side-to-side pulmonary-aortic anastomosis, but when the aorta is right-sided as it is in about 20% of cases, we perform a Blalock-Taussig<sup>13</sup> subclavian-pulmonary artery anastomosis.

*Coarctation of the aorta.*—The diagnosis of coarctation is frequently not made until adolescent or early adult life, since symptoms usually are mild or absent, and the upper extremity hypertension is either unrecognized or minimal prior to that age. Absence or diminution of femoral arterial pulsation leads the astute clinician to considering the possibility of coarctation. Adults with coarctation should be operated upon as soon as the diagnosis is established. Children with asymptomatic coarctation should have surgery performed at nine or ten years of age. Occasionally, young children with coarctation develop serious hypertension and the surgeon is forced to intervene earlier. We believe, however, that even when interrupted aortic sutures are used, the growth of the anastomosis may not keep pace with that of the child; hence we prefer to avoid surgery for coarctation in infants or small children whenever possible.

Occasionally, early in infancy a coarctation may produce serious symptoms with evidence of heart failure. We have not found it necessary to operate upon any of these infants, since if they are treated medically with digitalis, and supportive oxygen administration, they can be tided along for a month or two until their collateral circulation is established with resulting spontaneous improvement. Operation then can be deferred until they are older, and are more suitable candidates for surgery.

Excision of the coarctation with aortic anastomosis, either with or without an aortic graft, is the treatment of choice. The interruption and turning down of the subclavian artery to bridge a long coarctation as described by Blalock<sup>14</sup> and Bing<sup>15</sup> has not been satisfactory in our hands.

*Umbilical hernia.*—Herniation of the umbilicus is frequently seen in infants and rarely requires surgical repair. Wide adhesive tape strapping

applied over the hernia in a "slot and key" manner, usually will bring about closure of the defect within three or four months. A coin strapped over the umbilicus is of no advantage and frequently irritates the skin. Umbilical hernias which have not closed after six months of adequate strapping, large hernias, and hernias in children over one year of age, should be operated upon. The skin incision can be very small—made within the folds of the umbilicus itself. The hernial sac is dissected free, sutured closed, inverted and covered by fascial layers of the rectus sheath. Wound closure is effected by buried subcuticular sutures so that the children may be discharged from hospital on the day of operation. From 1940 through 1951, 439 umbilical herniorrhaphies at the Boston Children's Hospital were performed by this method, and the results in all cases have been very satisfactory.

*Inguinal hernia.*—Inguinal hernias occur frequently in infants and children. Most cause few or no symptoms and it is only because the mother notices an intermittent inguinal bulging that attention is drawn to the condition. On examination no mass usually is visible, and methods for detecting hernias in adults cannot be applied since small children will not cough or strain, or stand still when instructed to do so. In infants and young children the diagnosis of inguinal hernia can be established in close to 100% of instances by palpating the empty hernial sac within the inguinal canal. This is done by gently moving one finger from side to side over the spermatic cord as it passes along the canal. When a hernial sac is present the region is thicker than normal and a highly characteristic "silk glove" type of crepitation is imparted to the palpating finger. Because the risk of incarceration is great, and because surgical repair is simple, safe and curative, we now recommend that all infants and children with inguinal hernias be operated upon as soon as the diagnosis is made. The only exceptions to this are those infants who are under six to seven pounds in weight or who have some other serious illness. With these the surgeon is sometimes forced into early operation, but if surgery can be delayed until the infant is gaining weight and doing well, the result is far more likely to be satisfactory. When operative repair must be delayed, a well-fitting yarn truss will temporarily keep the hernia reduced. A truss by itself will not cure a hernia, and it also has the disadvan-



tages of irritating the skin and of imparting a false sense of security. In several instances we have seen hernias become incarcerated under such trusses.

For surgical correction of inguinal hernias in infants and children the important step is complete excision of the sac, but this should always be followed with a modified Ferguson repair of the canal structures. The skin incision is made transversely in the distal skin crease of the abdomen, the wound closure is by subcuticular sutures with a covering of collodion. These patients are routinely sent home on their first post-operative days. From amongst 3,874 inguinal herniorrhaphies performed in this hospital from 1940 through 1951, there were only six recurrences, and in these it is doubtful if the entire sac had been removed at the original operation.

*Hydrocele.*—Hydroceles are frequently encountered in paediatric practice. In infants under one year of age they rarely require surgery, oftentimes disappearing spontaneously. If there is an associated hernia, if the hydrocele is large or causes discomfort, then it should be operated upon. A hydrocele persisting or appearing after the first year of life has little tendency to subside spontaneously and almost always has an associated hernia. In these children the hydrocele and the hernial sac should be excised. Treatment by aspiration is to be avoided in infants and children.

*Undescended testicles.*—Approximately 50% of undescended testicles are right-sided, 30% are left-sided, and in 20% of cases the condition is bilateral. The testicle may simply be undescended, or it may actually lie in an ectopic position.

During the examination for undescended testes great care must be taken to be sure that the testis is not simply retracted up into the inguinal canal by an active cremasteric reflex. If the room is warm, the examiner gentle, and his hands are not cold, the simple retracted testis can easily be brought down into the scrotum, and so differentiated from the true undescended testis. Accompanying the majority of undescended testes, there are associated indirect inguinal hernias.

Occasionally, because of symptoms caused by the hernia, the surgeon is forced into performing herniorrhaphy and orchidopexy at an early age. Whenever possible, we prefer to delay orchidopexy until the boy is nine or ten years of

age. Hormone therapy in our experience has been of little or no value and precipitates the descent of only those testicles which would spontaneously descend if left alone until puberty when the child makes his own gonadotropic hormones. The operation of choice is one that is made through a long cutaneous incision overlying the inguinal canal. The hernial sac is dissected free, ligated and excised, following which the vas deferens and spermatic vessels are freed high up retroperitoneally. The scrotum is then stretched and by means of a traction suture placed at the lower pole of the testicle and through the inferior scrotal wall, the testicle is drawn down into the scrotum. The traction suture is attached through an elastic rubber band to adhesive tape on the opposite thigh. Its purpose is not to pull the testicle down but simply to maintain its position until healing has occurred. We believe that Torek operations are unnecessary and to use them is an admission that sufficient freedom of the cord has not been obtained. In cases with bilateral undescended testicles one side is operated upon at a time, although both sides may be operated upon, one week apart, during the one hospitalization.

*Hypospadias.*—Depending upon the site of the meatal opening, the hypospadias is either glandular, penile, or perineal. The glandular type, which has the meatal opening just at, or proximal to the frenulum, usually requires no surgical correction. Penile or perineal types of hypospadias require surgical correction if voiding in the standing position is to be satisfactory and if normal insemination is to be achieved during later life. In our experience, surgery is best performed in stages. As the boy with hypospadias grows and his penis enlarges, there develops a ventral bowing or chordee which is due to contracting fibrous bands in and around the corpus spongiosum. This chordee should be corrected at three to four years of age by dividing the fibrous bands, and by lengthening the ventral skin of the penis by "Z plasty". Construction of the penile urethra is delayed until the boy is ten or twelve years of age, since by that time the penis approaches adult size. The technique employed by MacCollum<sup>16</sup> at this hospital is to tunnel through the subcutaneous tissues on the under surface of the penis and to insert an inverted Thiersch graft tube of skin. The channel so formed is later connected to the proximal urethra. Repairs performed earlier in life such as

described by Young<sup>17</sup> do not in our opinion give as satisfactory a result. Circumcision should never be performed on boys with hypospadias since the prepuce may at times supply skin which may be required during surgical correction.

*Exstrophy of the bladder.*—This is one of the most distressing of all congenital anomalies, since the bladder, opening as it does on the lower abdominal wall, allows a continual leak of urine. The everted and exposed bladder mucosa is very sensitive, and during the first few years of life it is advisable to protect it by clean, although not sterile, vaseline gauze over which the diaper is worn. The treatment of choice for this condition consists of uretero-sigmoidostomy with subsequent excision of the exstrophied bladder and plastic reconstruction of the penis or vulva. We prefer to delay ureteral transplantation until two to four years of age, after the child has developed good anal sphincter control. To transplant the ureters prior to this time means an almost continual leakage of urine and faeces from the anus and it is our opinion that development of anal sphincter control is thereby delayed. Bilateral uretero-sigmoidostomy is performed in one stage; six months to a year later, excision of the bladder and repair of the co-existing epispadias is carried out. The wide bony defect at the symphysis pubis causes these children to walk with a waddling gait. No orthopaedic procedure is required for this defect because the pelvis tends to stabilize as the child grows older.

*Webbed digits.*—Webbing of the fingers or toes may involve only one pair of digits or may be multiple and bilateral. Webbed toes need no surgical correction unless severe or disabling deformity results. Webbed fingers are corrected surgically as described by MacCollum<sup>18</sup> at from three to five years of age. The necessity for skin grafting and prolonged postoperative splinting makes it essential that the operation be delayed until the hands have grown large enough to splint satisfactorily.

*Supernumerary digits.*—Rudimentary small tabs may be excised at any age, but complete extra fingers, particularly those with fused metacarpal or phalangeal bones should not have excision performed until the child is two or three years old. At this age, the necessary postoperative splinting can be more adequately maintained. Extra toes should be removed before the

child learns to walk, so that properly fitting shoes may be worn.

*Hæmangiomas.*—These may be present at birth or may appear shortly thereafter. They vary greatly in size, but most are small and capillary in type. In our clinic, in all but the very small hæmangiomas which usually will disappear spontaneously, we have found contact or superficial Roentgen therapy most useful. During therapy, care must be taken to shield underlying epiphyseal lines and tooth buds, else disturbances in their growth may result.

*Pigmented nævi.*—Large hairy pigmented nævi fortunately are rare. The majority of them are small and can be excised and the wounds either primarily closed, or grafted. While malignant change before puberty is rare, in all cases excision should be wide, and carried deep into the subcutaneous tissues. Because the pigmented area is poorly demarcated during infancy, we defer operation until the child is two to six years of age.

#### SUMMARY

The more common lesions of childhood requiring elective surgery, and the ages and procedures of choice for their correction have been briefly reviewed. It must be emphasized that many of these procedures are technically difficult, and of great magnitude. These should only be attempted by trained surgeons in hospitals where anæsthetists, surgical staff, and nurses are experienced in the surgical care of small infants and children.

#### REFERENCES

1. LANMAN, T. H.: *J. Pediat.*, 4: 107, 1934.
2. LADD, W. E. AND GROSS, R. E.: *Abdominal Surgery of Infancy and Childhood*, W. B. Saunders Co., Philadelphia, 1941.
3. GROSS, R. E.: *The Surgery of Infancy and Childhood*, W. B. Saunders Co., Philadelphia, 1953.
4. *Idem*: *Clinics*, 2: 363, 1943.
5. LONGINO, L. A.: *J. Arkansas M. Soc.*, 48: 113, 1951.
6. GRABER, I. M.: *Surg., Gynec. & Obst.*, 88: 359, 1949.
7. V. LANGENBECK, B.: *Archiv. f. Klin. Chir.*, 2: 205, 1861.
8. CONWAY, H.: *Surgery*, 22: 341, 1947.
9. MACCOLLUM, D. W.: *J. A. M. A.*, 110: 1427, 1938.
10. GROSS, R. E. AND HURWITT, E. S.: *Surg., Gynec. & Obst.*, 87: 599, 1948.
11. GROSS, R. E. AND LONGINO, L. A.: *Circulation*, 3: 125, 1951.
12. POTTS, W. J., SMITH, S. AND GIBSON, S.: *J. A. M. A.*, 132: 627, 1946.
13. BLALOCK, A. AND TAUSSIG, H. B.: *J. A. M. A.*, 128: 189, 1945.
14. BLALOCK, A. AND PARK, E. A.: *Ann. Surg.*, 119: 445, 1944.
15. BING, R. J., HANDELSMAN, J. C., CAMPBELL, J. A., GRISWOLD, H. E. AND BLALOCK, A.: *Ann. Surg.*, 128: 803, 1948.
16. MACCOLLUM, D. W.: *Treatment of Hypospadias. A Review of 392 cases.* To be published.
17. YOUNG, F. AND BENJAMIN, J. A.: *Surgery*, 26: 384, 1949.



## STUDIES IN LOBOTOMY\*

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THIS REPORT presents the results of a systemic detailed investigation of the first series of psychotic patients at Ste. Anne's Hospital on whom bilateral prefrontal lobotomy was performed for alleviation of their mental illness. The research program was planned to study various metabolic and physiologic functions of these patients before and after the operation. It was considered of some importance to know what effects, if any, may result from the lobotomy procedure either directly from severance of the white matter in the frontal lobes or indirectly through a change in the mental reaction of the patients. It was also thought that any measurable changes in the metabolism or physiology, which may be brought about by this treatment, might aid in the understanding of the means by which

schizophrenics (paranoid and catatonic subtypes) in whom other physical methods of treatment, such as electroshock and insulin-coma therapies, had failed and a lobotomy was considered the last resort. Three types of operative procedure (Freeman and Watts, McKenzie, transorbital) were used on this series of patients as shown in Table I. Selection of the cases for the type of operative procedure was done at random, eleven patients forming each group.

Since the selection of patients in the first instance was based primarily on therapeutic rather than investigative requirements, the number of cases for whom we present data varies according to their capacity to co-operate for the different tests. Table I shows the maximum number of co-operative patients before operation in each group. Not in all cases, however, was it possible to carry through the complete investigative program before and/or after lobotomy since some patients become more unco-operative after operation. Reference to this has been made in a

TABLE I.

	No. of cases studied	Age at operation Average	Range	Length of psychosis Average	Range
Group I (Freeman and Watts technique) ..	8	27.3	23-34	4.5	3-7
Group II (McKenzie technique) .....	9	32.1	25-42	5.6	3-8
Group III (Transorbital technique) .....	7	28.1	26-30	6.2	5-8

frontal lobotomy produces its effects upon the schizophrenic process.

Some of the studies included in this series were: blood cytology, blood chemistry, carbohydrate metabolism, liver function, gastric secretion, gastro-intestinal motility, blood pressure responses to autonomic stimuli, respiratory function, bladder function and body weight.

A similar comprehensive investigation on a larger scale was carried out by the Columbia-Greystone Associates. Their results on a group of 24 topectomy cases and a series of controls were published in a detailed book in 1949.<sup>1</sup> Reference to this work and the results of other investigators in various phases of the effects of lobotomy will be made later in the paper.

### CASE MATERIAL AND METHODS

*Case material.*—Thirty-three male patients were selected for operation. They were chronic

previous report.<sup>2</sup> To compensate for this situation, the number of those tests which could be performed on the co-operative patients was increased. Each test was done two or three times before operation, and repeated several times at periodic intervals up to one year following operation. In this way each patient served as his own control and was studied over a longer period. The number of tests referred to in the results is thus much greater than the number of patients in each group.

No attempt is made here to describe the different operative techniques used. All operations were performed by Dr. Harold Elliott at the Queen Mary Veterans' Hospital in Montreal, and he has described the technical procedures in previous reports.<sup>3, 4</sup> It is perhaps worth mentioning that the conventional standard Freeman and Watts lobotomy is considered the most radical of the three techniques used in this study.

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**Blood chemistry.**—Blood sugar estimations were done by the Folin modification of the Folin-Wu method, adapted for the spectrophotometer. The pyruvate of blood was first stabilized with iodoacetate and then estimated by the method of Klein.<sup>5</sup> Total blood cholesterol was estimated by the method of Bloor, modified and adapted to the spectrophotometer. Total proteins and protein fractions, separated by Kingsley's modification of Howe's procedure (but at a 1 in 20 dilution), were done by the biuret reaction as described by Gornall.<sup>6</sup>

For the Bromsulphthalein test, the 5 mgm. per kg. dose was used and the reading taken 30 minutes after intravenous administration. The one hour intravenous hippuric acid test was utilized.

**Gastric secretion.**—Gastric analyses were done after a 12 to 14 hour overnight fast. An intranasal tube was used in all cases. After the fasting residuum was withdrawn, the volume of intermittent (or interdigestive) secretion of the stomach was measured every 15 minutes until a uniform basal rate of secretion was obtained. Usually the time required was one hour. After the volume and acidity of the basal secretion were determined, the gastric secretagogue was administered. The volume and free and total acidity of the gastric secretion in response to the stimulus were then measured at 15 minute intervals for 2 hours or until the basal rate of secretion was resumed.

Free and total acidity were determined on each specimen by titration with 0.1 N sodium hydroxide using Töpfer's reagent and phenolphthalein as indicators. Blood samples for glucose level were taken before and during the insulin test at 15 minute,  $\frac{1}{2}$ , 1,  $1\frac{1}{2}$  and 2 hour intervals.

Four different stimuli for gastric secretion were investigated: (1) A histamine (0.5 mgm.) subcutaneous injection was used to study the gastric phase. (2) Insulin (8 to 15 units intravenously) stimulates the cephalic or nervous phase (vagal) by virtue of the hypoglycæmia which it induces. (3) In order to eliminate any indirect effects due to possible alterations in the carbohydrate metabolism or insulin sensitivity of these patients, prostigmine was utilized in another series of tests in doses of 0.5 mgm. intravenously. Being an anti-cholinesterase drug, it preserves the action of acetylcholine at the vagal nerve endings. (4) The psychic phase of gastric secretion was also studied in some patients by the method of Winkelstein<sup>7</sup> using an orange as the psychogenic stimulus, while in other circumstances the patient was allowed to see and smell some appetizing food with a savoury odour.

**Cardiovascular system.**—Prior to all tests, the patient was placed in the dorsal recumbent position and allowed to rest for a  $\frac{1}{2}$  hour. The blood pressure was then determined, on one arm, with a mercury sphygmomanometer at 2 minute intervals, until stationary values were obtained. Following this, the special test was performed. Measurements were made of changes in blood pressure, and in the case of the carotid sinus pressure tests, pulse rates were determined. During some of the tests, electrocardiographic records (Lead II) were taken.

The cold pressor test was performed according to the standard method of Hines.<sup>8</sup> After the baseline blood pressure was determined, one arm was placed in iced water (3 to 5° C.) with the water level above the wrist for one minute. The blood pressure was measured on the other arm at 30 second and one minute intervals during immersion, and at one minute intervals after removal of the hand from the cold water in order to detect delayed pressor effects. This test involves a local peripheral vasoconstriction to the cold, and is probably effective primarily as a means of sympathetic stimulation.

**Epinephrine test.**—After the control observations, epinephrine (0.05 mgm. in 1 ml. of normal saline) was given intravenously in 2 to 5 seconds, and the blood pressure measured at 30 second and at one minute intervals thereafter until it returned to pre-injection levels for three subsequent readings. In order to evaluate the

emotional stimulus derived from the venipuncture, and its possible effect on the cardiovascular system, control injections of 1 ml. of normal saline were administered. The results of injection of physiological saline were essentially negative. Fluctuations in the blood pressure never exceeded 5 mm. Hg.

**Carotid sinus pressure.**—After stationary control values of pulse rate were obtained, physical pressure was applied to the carotid sinus, alternately to right and left sides. The duration and intensity of the pressure was varied so as to avoid producing loss of consciousness in those with a sensitive carotid sinus and to elicit a maximum effect in those with an insensitive carotid sinus. The maximum duration of pressure was about 60 seconds, the minimum about 15 seconds. Pulse rate counting was continued after the finger was removed from the carotid sinus until recovery to pre-stimulation levels was obtained.

## RESULTS AND DISCUSSION

I. **Blood cytology.** Some of the results are shown in Table II. In addition, with each W.B.C. examination a complete differential count was done including the small and large lymphocytes. No significant changes were observed in any examinations with the possible exception of the sedimentation rate. There is a suggestion that, in all 3 groups, the first 3 months' postoperative examinations tended to be above the preoperative level. However, all of the results were more or less within considered normal ranges.

With each blood examination a prothrombin time was also done. Control readings were with bloods from non-mental hospital patients. Curiously, practically all prothrombin readings were anywhere from 1 to 10 seconds above the control readings. However, there was no significant difference between the preoperative and postoperative results.

II. **Blood chemistry.**—A great deal of blood chemistry was done on all the patients in groups 1, 2 and 3, both preoperatively as well as postoperatively. Some of these results are shown in Table III. We had anticipated that if any effects would be induced by these operative procedures, these would likely be shown in respect to the various aspects of carbohydrate metabolism. Insofar as blood pyruvate is concerned, it will be seen that there were no significant changes even though a great number of analyses were done. Similarly, blood cholesterol values showed no change.

In regard to total serum proteins, there may be a suggestion of a slight though non-significant drop in total proteins in the results secured in the first 3 postoperative months. It is possible that this is associated with postoperative trauma. The serum albumin results tend to show the same tendency. Simultaneously with each serum



protein estimation, we carried out a quantitative globulin fractionation for total globulin, euglobulin and pseudoglobulin. There were no significant changes in any of these determinations.

A careful study of the results showed that in general there was an appreciable drop in serum cholesterol, total proteins and albumin the first week or two after operation. The serum proteins tended to return to preoperative levels within a week to 10 days after operation; the cholesterol levels tended to remain low for 2 to 3 weeks after operation. These decreases probably are not peculiar to prefrontal lobotomy in schizophrenics,

as similar decreases have been noted in these constituents in non-schizophrenic patients following a major operation. There were no particularly significant changes in serum globulins.

III. *Carbohydrate metabolism.* In order to obtain further information on possible effects on carbohydrate metabolism a great number of oral and intravenous glucose tolerance tests were done both preoperatively as well as postoperatively. Generally at least one test pre- as well as post-operatively were done per patient—in many instances the tests were repeated at monthly intervals up to one year and 4 months postoperatively. The results are graphically

TABLE II.

BLOOD CYTOLOGY									
	Group I			Group II			Group III		
	No. of tests	Average	Range	No. of tests	Average	Range	No. of tests	Average	Range
<i>R.B.C.</i>									
Preoperative.....	8	5.2	4.7-5.9	6	4.9	4.3-5.7	6	4.9	4.5-5.1
Postop. first 3 mos...	8	4.9	4.6-5.3	2	5.3	5.2-5.4	10	4.6	4.1-4.9
Postop. 3 to 12 mos...	12	5.0	4.4-5.2	6	4.9	4.7-5.1	2	4.8	4.8-4.9
<i>Hæmoglobin</i>									
Preoperative.....	8	16.2	14.8-17.7	16	15.0	13.0-18.2	15	15.6	14.1-17.0
Postop. first 3 mos...	9	14.9	12.9-15.6	11	15.1	12.0-17.8	13	14.5	12.2-15.6
Postop. 3 to 12 mos...	22	15.5	13.8-17.0	16	15.3	13.4-16.6	2	15.2	15.2
<i>W.B.C.</i>									
Preoperative.....	8	7.2	5.3-9.7	15	7.0	4.4-10.1	15	6.6	4.2-11.2
Postop. first 3 mos...	9	8.0	5.2-16.0	11	7.0	5.2-10.9	13	6.2	5.0-7.7
Postop. 3 to 12 mos...	22	6.3	4.4-8.1	17	6.8	4.6-9.1	2	6.0	5.2-6.9
<i>Sed. rate (Westergren)</i>									
Preoperative.....	7	7.4	1-21	16	5.4	1-13	15	6.6	2-17
Postop. first 3 mos...	7	9.6	5-20	11	7.0	2-23	12	8.4	3-17
Postop. 3 to 12 mos...	22	9.1	2-35	17	6.2	2-23	2	9.0	3-5

TABLE III.

BLOOD CHEMISTRY									
	Group I			Group II			Group III		
	No. of tests	Average	Range	No. of tests	Average	Range	No. of tests	Average	Range
<i>Pyruvic acid (mgm. per 100 ml.)</i>									
Preoperative.....	11	1.0	0.7-1.8	12	1.2	0.7-2.2	12	1.1	0.7-1.6
Postop. first 3 mos...	9	0.9	0.6-1.4	9	1.1	0.9-1.3	11	1.0	0.6-1.3
Postop. 3 to 12 mos...	18	1.0	0.6-1.3	15	1.1	0.7-1.6	2	0.8	0.7-0.8
<i>Cholesterol (mgm. per 100 ml.)</i>									
Preoperative.....	9	162	111-224	15	156	119-185	12	158	139-167
Postop. first 3 mos...	6	161	139-185	15	156	128-185	10	161	151-175
Postop. 3 to 12 mos...	19	163	119-275	14	163	145-196	2	167	167
<i>Total protein (gm. per 100 ml.)</i>									
Preoperative.....	8	7.2	6.8-7.9	12	7.5	6.6-8.5	11	7.6	6.7-9.6
Postop. first 3 mos...	5	6.9	6.3-7.4	10	7.1	6.2-8.1	12	7.2	6.3-9.2
Postop. 3 to 12 mos...	16	7.3	6.1-8.8	13	7.1	6.1-8.5	2	7.4	7.3-7.5
<i>Albumin (gm. per 100 ml.)</i>									
Preoperative.....	8	3.7	2.5-5.8	11	3.8	3.1-4.4	11	3.9	3.3-4.5
Postop. first 3 mos...	5	3.6	3.4-4.9	10	3.8	3.4-4.4	12	3.6	3.0-4.2
Postop. 3 to 12 mos...	16	3.9	3.3-4.7	13	3.9	3.0-4.8	2	3.4	3.1-3.6

illustrated in Figs. 1 and 2. Each point on these graphs represents an average of from 7 to 32 individual analyses.

In general the uniformity is quite surprising. There is no significant change resulting from the operation. However, there is uniformly a significant delay in return to normal which definitely seems to be specific to the group of patients we were dealing with. This may very well signify a lack or delay in insulin secretion resulting from high blood sugar.

At first we had not intended to do insulin sensitivity studies in regard to blood sugar levels. However, insulin was used as a stimulant for

as 16 tests within an 18 month period. Four patients, one in group 2 and 3 in group 1, showed marked but variable resistance to as much as 50 units of insulin given in 2 doses one hour apart. In 3 of these patients this resistance of blood sugar to intravenously administered insulin has persisted up to one year and 4 months postoperatively. One patient, however, showed resistance for the first 6 months postoperatively, but since then has shown a normal sensitivity.

The other patients in the group showed no particular tendency towards a resistance to insulin.

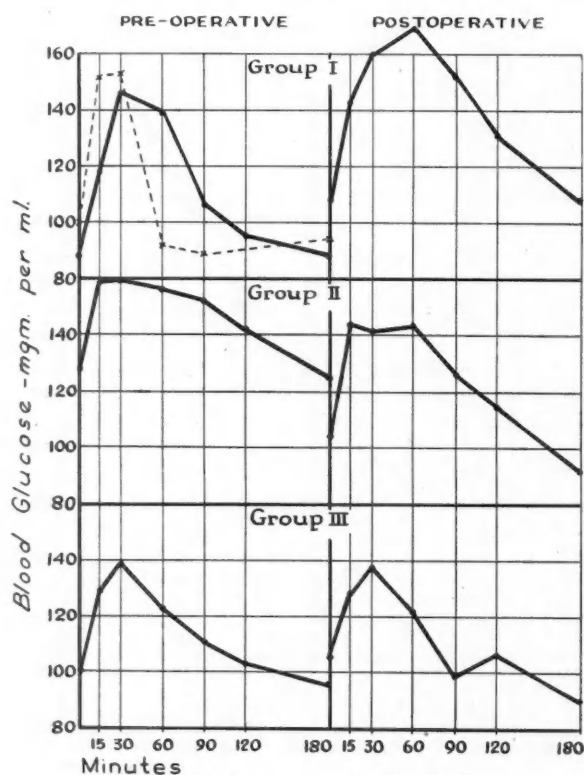


Fig. 1.—Oral glucose tolerance tests.

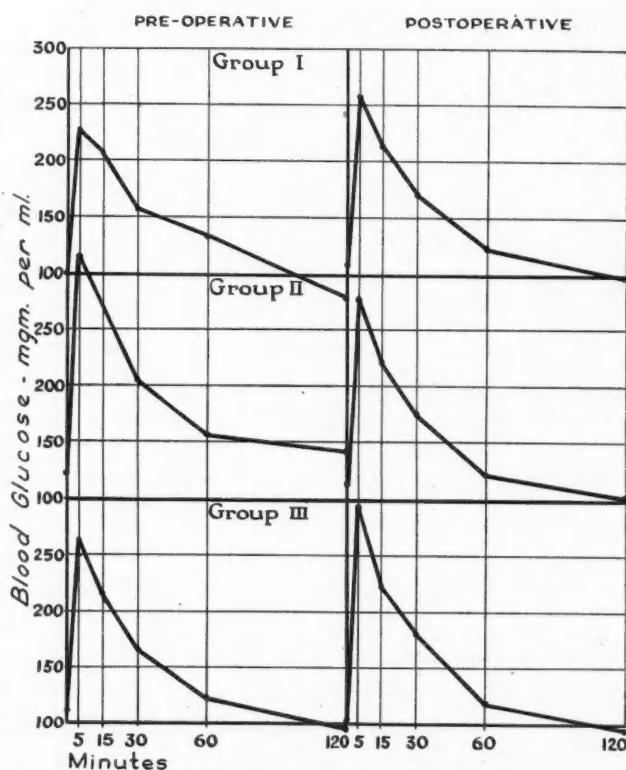


Fig. 2.—Intravenous glucose tolerance tests.

gastric secretion and, with this, repeat blood sugar determinations were made. In most instances readings were taken at pre-injection, then at 15, 30, 60, 90 and 120 minutes post-injection.

The dosage of insulin varied from 8 to 15 units insulin (this would correspond approximately to from 0.1 to 0.2 units per kg. body weight). With the exception of 2 or 3 uncooperative patients, the preoperative insulin tolerance curves were quite typical of those obtained in normal people given approximately 0.1 unit per kg. intravenously.

Postoperatively repeat insulin sensitivity studies were done on all patients up to as many

IV. *Liver function tests.*—In addition to the studies reported above, repeated hippuric acid excretion as well as Bromsulphthalein retention tests were done preoperatively as well as postoperatively. The results are tabulated in Table IV. There were no significant changes evident as a result of the operation.

Repeated cephalin-cholesterol flocculation tests were also done monthly on all the patients pre- as well as post-operatively. Five of these showed fairly persistent abnormal results varying from 2+ to 4+. They were all catatonics. One had a history of jaundice some years previously.



V. *Respiratory function*.—Numerous B.M.R. measurements were done on most patients pre- and postoperatively. Many of these results had to be discarded because of incomplete relaxation of patients during the test. However, those secured with a minimum or no disturbance during the test were all recorded. We accepted a  $\pm 15\%$  change of B.M.R. as being within the normal range. The odd single reading was outside the normal range. Nevertheless, with very few exceptions all the readings fell within the

VI. *Gastric secretion*.—The results of the different types of gastric tests before and after lobotomy are shown in Table V. After an analysis of the individual results in every case was studied, it was decided to combine all the data for each series of gastric tests and treat them as one group. The reasons for this method were: (a) There was an insufficient number of patients in each operative group to make a valid comparison as to type of operation, and (b) no additional information could be gained by pre-

TABLE IV.

LIVER FUNCTION TESTS									
	Group I			Group II			Group III		
	No. of tests	Average	Range	No. of tests	Average	Range	No. of tests	Average	Range
<i>Hippuric acid (gm.)</i>									
Preoperative.....	8	1.53	0.50-3.58	11	1.64	0.15-4.00	9	1.51	1.02-2.17
Postop. first 3 mos...	6	2.21	1.22-3.21	3	1.18	0.98-1.88	8	1.56	1.02-1.94
Postop. 3 to 12 mos..	10	1.56	0.42-2.57	15	1.52	0.84-2.07	4	1.80	1.66-1.95
<i>B.S.P. %</i>									
Preoperative.....	9	5.88	2.6-10.0	12	4.45	1.9-8.3	13	5.22	1.0-13.8
Postop. first 3 mos...	6	6.98	4.0-10.0	8	3.36	1.9-8.0	8	4.82	1.9-9.0
Postop. 3 to 12 mos..	10	3.69	1.0-7.9	9	3.68	1.1-6.4	3	5.16	3.6-7.9

TABLE V.

	No. of tests	Average volume		Average free acid		Average total acid	
		Per 15 min.	Max. 15 min.	Per 15 min.	Max. 15 min.	Per 15 min.	Max. 15 min.
<i>Histamine</i>							
Preoperative.....	25	28.1	43.5	57.8	74.6	67.6	87.5
Postoperative first 3 months.....	14	25.6	40.6	55.9	76.9	64.7	86.5
Postoperative 3 to 12 months.....	12	23.0	38.4	44.1	76.0	54.2	85.3
<i>Prostigmine</i>							
Preoperative.....	29	32.3	58.6	32.9	36.6	43.3	46.4
Postoperative first 3 months.....	15	28.8	43.3	32.1	35.1	41.6	45.1
Postoperative 3 to 12 months.....	12	34.2	61.0	24.5	34.2	34.0	43.2
<i>Insulin</i>							
Preoperative.....	21	32.5	45.6	68.8	86.7	79.1	97.5
Postoperative first 3 months.....	11	34.5	51.2	65.2	83.7	74.5	93.3
Postoperative 3 to 12 months.....	26	31.0	51.4	51.3	63.2	66.1	74.2
<i>Psychic</i>							
Preoperative.....	12	17.6	22.7	32.5	41.8	44.7	54.6
Postoperative first 3 months.....	8	14.8	21.4	42.1	44.6	53.4	55.1
Postoperative 3 to 12 months.....	14	14.7	19.4	20.0	24.3	30.3	35.7

normal range and there was no indication whatsoever of a change postoperatively as compared to the preoperative results. If anything, there seems to be a slight suggestion of a small decrease in those patients who showed a maximum gain in weight.

The respiratory rate and vital capacity studies were also done repeatedly on these patients. None of these results showed any significant tendency to change as a result of the operative procedures.

senting the results of each patient separately owing to extreme individual variation.

The results of each series of tests were analyzed similarly. An estimation of the average 15 minute volume and acidity (free and total) secreted over a 1½ or 2 hour period post-stimulation was made for all tests on the patients studied before and after lobotomy. Likewise the maximum volume and acidity per 15 minute interval secreted in response to the stimulus were averaged and recorded. The maximal secretion

in the insulin tests invariably occurred at the time when the blood sugar was at its lowest level.

It was apparent that the average figures could obscure any individual changes from pre- to postoperative period within the group. However, no uniformity in trends was observable and the stability of the average figures in the table was not due to an equal number of patients showing either an increase or decrease in their results. The ranges of variability are not indicated in the table for purposes of clarity in presentation

tion and cephalic stimulation of the gastric secretion with insulin, there was a tendency for the acidity (free and total) to decrease in the later postoperative periods (4 to 12 months). However, the number of patients studied during this period was too small to make this observation a significant one; and besides, it was not a consistent change in all the patients studied.

Further analysis of the data on basal secretion (Table III) obtained in the gastric studies indicated that this latent reduction in acidity

TABLE VI.

	No. of tests	Average volume	Average free acid	Average total acid
<i>Residual</i>				
Preoperative.....	87	30.2	32.8	44.6
Postoperative first 3 months.....	48	32.8	27.8	32.1
Postoperative 3 to 12 months.....	64	35.7	22.0	27.7
<i>Basal secretion (average 15 min.)</i>				
Preoperative.....	87	18.0	29.8	39.9
Postoperative first 3 months.....	48	16.7	26.3	38.0
Postoperative 3 to 12 months.....	64	16.0	21.0	32.2

TABLE VII.

	No. of tests	Average Systolic	Average Diastolic	Range
<i>Group I</i>				
Preoperative.....	27	120.8	68.9	Sys. 108-132 Dias. 50- 80
Postoperative first 3 months.....	26	114.6	69.5	Sus. 103-140 Dias. 53- 90
Postoperative 3 to 12 months.....	28	114.7	72.0	Sys. 105-132 Dias. 60- 80
<i>Group II.</i>				
Preoperative.....	24	115.8	72.7	Sys. 100-134 Dias. 60- 94
Postoperative first 3 months.....	16	113.6	70.2	Sys. 104-127 Dias. 48- 85
Postoperative 3 to 12 months.....	13	114.3	73.8	Sys. 106-124 Dias. 60- 86
<i>Group III</i>				
Preoperative.....	12	117.0	77.6	Sys. 99-130 Dias. 62-100
Postoperative first 3 months.....	10	116.9	77.6	Sys. 106-124 Dias. 70- 82
Postoperative 3 to 12 months.....	3	109.6	77.0	Sys. 104-121 Dias. 70- 87

of the results. The variability was within the expected range considering the difficulties attendant upon an investigation of this type on psychotic patients. There was as much variation in the results before operation as occurred after operation.

From the figures presented in Table V it is evident that there was no change in the gastric secretion (volume and acidity) in response to either histamine or prostigmine after operation. Both of these drugs act peripherally on the gastric glands. In the case of the psychic secre-

tion in response to psychic or cephalic stimulation may not be a specific phenomenon but rather a reflection of the general tendency of the gastric acidity of these lobotomy patients to diminish with time. This could be due to their quieter disposition, being less excited or disturbed by the procedure during this period. Table VI is a summary of all the data on the residual and basal secretion volumes and acidity obtained from every gastric test on all patients investigated before and after lobotomy. It can be seen that without the administration of a gastric



stimulant the trend after operation was a lower acidity with increase in time after operation.

There have been varied reports in the literature concerning the effects of lobotomy on gastric secretion. These were done in the early postoperative periods and none could be found with a follow-up of one year. An increased acidity was noted by Reed<sup>9</sup> in response to a testmeal 4 to 6 weeks after operation. Petersen and Buchstein<sup>10</sup> also noted an increased acidity in response to histamine after lobotomy. Varga *et al.*<sup>11</sup> using histamine, caffeine and insulin before and after prefrontal lobotomy noted a "diminished acid-secreting activity of the gastric glands" both in humans and dogs. Other investigators found no significant difference in

operative recordings were made after the patients had recovered from the immediate effects of the operation (approximately 10 days). The resting blood pressure values were all within the normal range. The average figures for Groups I and III in the table seem to indicate a tendency for the systolic blood pressure to diminish after operation. But these changes were small and within an expected range of variability, considering that with time the patients were more able to relax for the tests. In this connection it is of interest to note that Chapman *et al.*<sup>14</sup> found no consistency in the results of blood pressure on lobotomy patients up to one year after operation.

*Response to epinephrine.*—The average figures presented in Table VIII are based on the

TABLE VIII.

RESPONSE TO EPINEPHRINE									
Group I			Group II			Group III			
Average change	No. of tests	Range	Average change	No. of tests	Range	Average change	No. of tests	Range	
<i>Systolic B.P.</i>									
Preoperative.....	58.8	16	28-110	72.1	14	50-90	64.9	11	44-80
Postop. first 3 mos...	66.6	16	54-88	81.9	9	64-112	70.1	8	26-96
Postop. 3 to 12 mos...	81.7	23	54-116	71.6	10	56-64	59.3	3	40-80
<i>Diastolic B.P.</i>									
Preoperative.....	18.6	14	-40 to 60	26.1	14	-30 to 40	22.4	10	-34 to 38
Postop. first 3 mos...	18.3	16	-30 to 50	31.9	9	20-50	20.3	8	-18 to 28
Postop. 3 to 12 mos...	27.7	23	-20 to 56	21.6	10	-24 to 30	18.6	3	-30 to 16
RESPONSE TO COLD PRESSOR TEST									
<i>Systolic B.P.</i>									
Preoperative.....	14.5	30	0-36	15.6	25	2-30	18.0	23	4-34
Postop. first 3 mos...	21.6	32	12-43	20.4	17	10-34	20.3	13	2-40
Postop. 3 to 12 mos...	15.1	34	2-34	17.6	16	8-30	12.8	5	4-32
<i>Diastolic B.P.</i>									
Preoperative.....	18.0	30	6-42	13.6	25	0-44	19.2	23	4-38
Postop. first 3 mos...	15.8	32	0-44	17.1	17	6-32	24.6	15	8-44
Postop. 3 to 12 mos...	13.4	34	0-40	21.6	16	10-38	12.4	5	0-18

the amount of gastric secretion or the gastric acidity after frontal lobe surgery. Peyton *et al.*<sup>12</sup> state that the volume and acidity of the average 24 hour gastric secretion, and also in response to insulin injection, were not changed in 10 patients with prefrontal lobectomy. Carpenter<sup>13</sup> studied gastric acidity in response to a testmeal, adrenaline and insulin in a group of bilateral frontal topectomy patients. He found no demonstrable effect on gastric secretion within 5 weeks after surgery. The results in our series of gastric tests before and after lobotomy in general tend to agree with these latter authors.<sup>12, 13</sup>

VII. *Blood pressure.*—The average results of several blood pressure readings before and after lobotomy are recorded in Table VII. The post-

changes observed at the peak of response to the stimulus as compared to resting blood pressure values. All groups showed an average increased systolic pressure response to epinephrine within the first 3 months after operation. This was a fairly consistent result in the majority of individual patients. No consistent changes or trends were observed in the diastolic pressures of these patients. In Groups II and III the change was of a transitory nature and stability was usually achieved at preoperative levels after 3 months. In Group I the response to the drug gradually increased with time and was sustained up to one year after operation. No explanation for this effect can be offered other than the fact that the patients in this group had a more

radical type of operation (Freeman and Watts), whereas the patients in Group III who showed least change from preoperative levels had a less severe type of lobotomy (transorbital).

Rinkel *et al.*<sup>15</sup> reported an "overreaction" in the pressor response to epinephrine after lobotomy; whereas, Glaser<sup>16</sup> noted a slight, transient hyperreaction to the drug after topectomy.

**Cold pressor test.**—The average systolic pressure in each group of patients represented in Table VIII showed a transient increased reaction within the first 3 months after lobectomy. Again the greatest average systolic increase (7.0

a previous report.<sup>2</sup> It would be justifiable, therefore, to conclude that the transient increased blood pressure response to the iced water could be the result of an increased subjective psychic reaction to the stimulus, rather than an enhanced local peripheral vasoconstriction. Glaser<sup>16</sup> also attributes changes in the cold pressor test results to the "emotional reactivity" of chronic schizophrenic patients after frontal topectomy.

**Carotid sinus pressure.**—Results of pressure on the carotid sinus were inconsistent. There was no evidence of any increased sensitivity of the carotid sinus after lobotomy. The percentage of

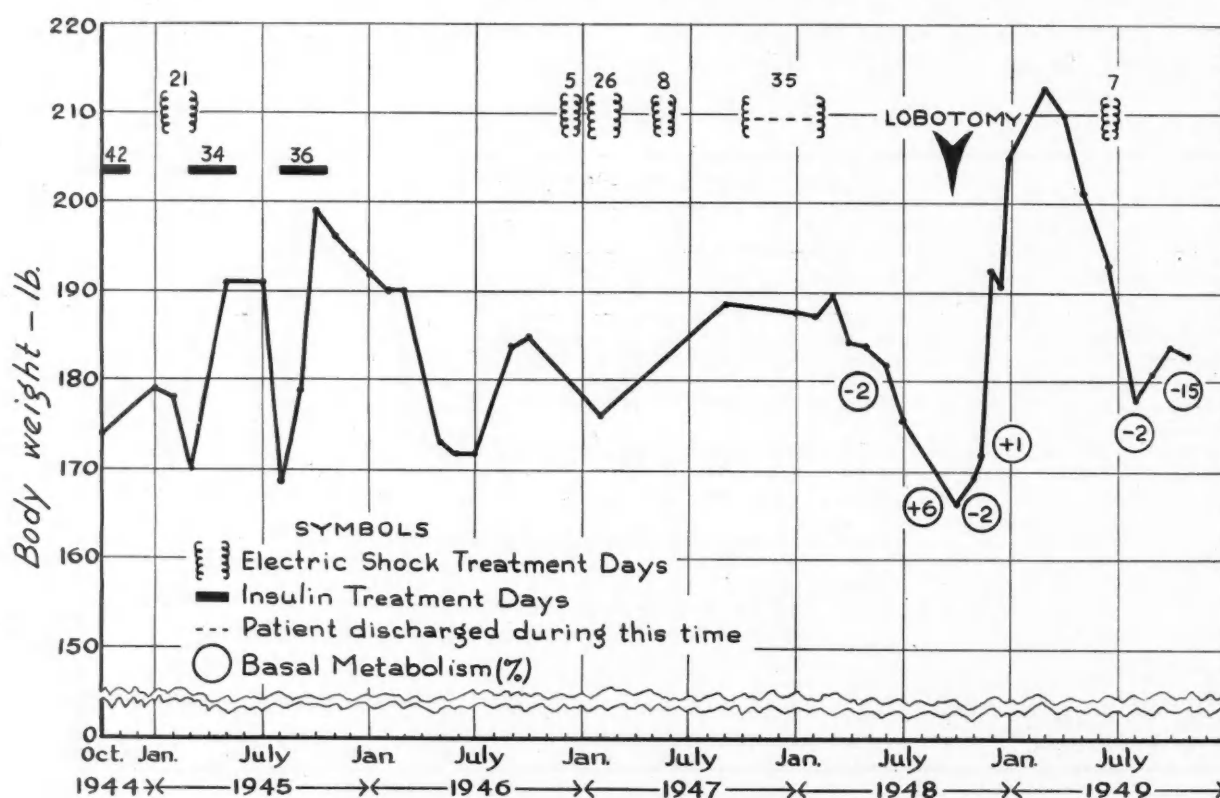


Fig. 3.—Changes in body weight with therapy: patient A.M.

mm. Hg.) occurred in Group I and the smallest (2.0 mm. Hg.) in Group III. There was a concomitant change in diastolic pressure in Groups II and III, whereas Group I showed a slight decrease.

Examination of the early postoperative data indicated that most of the rise in systolic pressure in response to the cold pressor test occurred during the first month after operation. This is an interesting observation in view of the fact that many of the patients during this period showed an increased sensitivity to unpleasant stimuli in general. Reference to this transitory increased reaction to obnoxious stimuli has been made in

cases responding to the pressure stimulus with a slowing of the pulse rate was the same before and after operation. Nor was it easier to elicit a response after lobotomy. This is contrary to the findings of Rinkel *et al.*<sup>15</sup> who noted a definite increased reaction to carotid sinus pressure in a group of lobotomy patients.

**VIII. Body weight.** In all patients the body weights were followed very carefully before as well as after operation. The results reported pre- as well as post-operatively are recorded in Table IV. These show that there were marked changes. Twelve patients showed an appreciable increase in body weight during the first 6 months



postoperatively. On the other hand, 21 patients showed no change in body weight or an appreciable decrease.

All of these patients had had other forms of treatment prior to lobotomy, namely ICT and EST. Most patients showed similar changes in body weight, although to a lesser degree, following these other forms of treatment. It seems to us that these changes are purely the result of variations in food intake by these patients. A typical result on one patient is shown in Fig. 3. This shows the marked fluctuations in body weight usually associated with any form of treatment.

#### SUMMARY AND CONCLUSIONS

In this report we have briefly reviewed the comprehensive studies that have been carried out in a group of 33 psychotic patients before and after lobotomy. These studies included blood cytology, blood chemistry, carbohydrate metabolism, liver function, gastric secretion, blood pressure responses to autonomic stimuli, respiratory function and body weight. In general our

findings have been similar to results that have been published by other authors. Although very interesting, they have not given much additional aid in understanding how lobotomy produces its effect upon the schizophrenic process, nor have they helped greatly towards better selection of patients for this treatment.

#### REFERENCES

1. Columbia-Greystone Associates, Selective Partial Ablation of the Cortex, P. Hoeber Co., 1949.
2. KARP, D.: *Treat. Serv. Bull.*, 5: 399, 1950.
3. ELLIOTT, H. AND DANCEY, T.: *Treat. Serv. Bull.*, 5: 169, 1950.
4. ELLIOTT, H. AND BEARDMORE, H. E.: *Treat. Serv. Bull.*, 5: 434, 1950.
5. KLEIN, D.: *J. Biol. Chem.*, 137: 311, 1941.
6. GORNALL, A., et al.: *J. Biol. Chem.*, 177: 751, 1949.
7. BABKIN, B. P.: *Secretory Mechanism of the Digestive Glands*, P. Hoeber Co., 1944.
8. HINES, E. A.: *Proc. Staff Meet., Mayo Clinic*, 14: 185, 1939.
9. REED, J. A.: *Gastroenterology*, 10: 118, 1948.
10. PETERSEN, M. C. AND BUCHSTEIN, H. F.: *Am. J. Psychiat.*, 104: 426, 1947.
11. VARGA, M., BENKE, S. AND HETENYE, G.: *Acta Medica Acad. Scientiarum Hungarica* (Budapest), 2: 229, 1951.
12. PEYTON, W. T., HAAVIK, J. E. AND SCHIELE, B. C.: *Arch. Neurol. & Psychiat.*, 62: 560, 1949.
13. CARPENTER, M. B.: *J. Nerv. & Ment. Dis.*, 113: 52, 1951.
14. CHAPMAN, W. P., LIVINGSTON, R. B. AND LIVINGSTON, K. E.: *Arch. Neurol. & Psychiat.*, 62: 701, 1949.
15. RINKEL, M., GREENBLATT, M., COON, G. P. AND SOLOMON, H. C.: *Arch. Neurol. & Psychiat.*, 58: 570, 1947.
16. GLASER, G. H.: *J. Nerv. & Ment. Dis.*, 115: 189, 1952.

#### A POST-SANATORIUM INSTITUTION FOR REHABILITATION IN TUBERCULOSIS

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THE DEPARTMENT of Veterans' Affairs of Canada quietly opened the doors of a tuberculosis rehabilitation centre in London, Ontario, for the benefit of the Canadian veteran of World War II, on July 14, 1947. Dr. R. A. Benson, as Medical Superintendent of the Peterborough Veterans' Hospital for tuberculosis, and Edward A. Dunlop, as superintendent of Casualty rehabilitation for the Department of Veterans' Affairs gave birth to the idea. The institution was proposed on the fact that convalescent health and occupational centres had been established to care for all casualties other than those veterans suffering from tuberculosis, while there was also felt the great need for the availability of such a post-sanatorium rehabilitation institution for all per-

sons who had required sanatorium treatment. It is known as Western Counties Veterans' Lodge.

We are all aware of the fact that in-sanatorium rehabilitation in tuberculosis is essential. We know, unfortunately, that in the post-sanatorium period there still exists for many nothing but the out-dated home convalescence. There are, however, many varied programs throughout the world. Without elaborating on these, it is the purpose of this article to explain the method of institutional rehabilitation in tuberculosis, as it was offered by the Department of Veterans' Affairs of Canada to the veterans who were anxious to accept further "institutional" rehabilitation in the post-sanatorium period.

#### THE PATIENT OR REHABILITANT

The people coming to this centre were all male veterans accepting admission on a voluntary basis. The centre has operated for three and a half years, with a capacity of 150 "living-in" patients. The source of veteran patients was insufficient to maintain more than an average strength of about 140 for a period of one year.

As of July 14, 1950, after three years in operation just over 500 men had entered the centre.

Medically, with rare exceptions the patient had a negative sputum or gastric lavage culture and had reached the quiescent stage of his treatment as a minimum requirement for admission. Men with any type of tuberculosis and degree of disease have been accepted with the majority of course falling into the pulmonary group (see Table I).

These veterans of World War II came from the Province of Ontario, the Maritime Provinces and Quebec. (Home 1,000 miles away in many cases). The age group was 22 to 54, with only 5 over 45 years of age. The average age was 27 years. Approximately 33% were married. Most men came to the centre directly from the sanatorium and others, admitted during the early

#### REHABILITATION

In order to organize any program, one must have a definition of the aim and build the staff and obtain the equipment to fit the definition. The aim of this centre was to rehabilitate the tuberculosis veteran. The most concise definition of rehabilitation has been the restoration of the disabled to the maximum physical, mental, social, economic, and vocational capacity of which they are capable.

The staff at the institution consisted of physicians, psychologists, instructors and vocational guidance counsellors (Veterans' Welfare Officers). The social service workers' task was conducted through the Department's District office. The immediate economic aspect of rehabilitation was controlled through granting of pensions

TABLE I.

CLASSIFICATION OF DISEASE—PATIENTS DISCHARGED FROM W.C.V.L.,  
AND THOSE REMAINING ON STRENGTH AS OF DEC. 15/50  
THIS TABLE DOES NOT INCLUDE THOSE CLASSED AS TRANSFERS TO TREATMENT<sup>1</sup>

Disease classification	No. and percentage of patients discharged						No. and percentage of patients still at the lodge as of Dec. 15/50	
	July 14, 1947 to December 31, 1948		During the year of 1949		During the year of 1950			
Pleurisy with effusion.....	13	8.1%	3	1.8%	6	6.6%	1	1.7%
Disseminated tuberculosis.....	3	1.9%	6	3.6%	3	3.3%	2	3.5%
Pulmonary tuberculosis minimal..	53	33.1%	33	19.9%	16	17.6%	5	6.9%
Pulmonary tuberculosis moderately advanced.....	69	43.2%	86	51.8%	43	47.2%	33	58.6%
Pulmonary tuberculosis far advanced.....	17	10.6%	35	21.1%	19	20.9%	14	24.1%
Extra-pulmonary.....	5	3.1%	3	1.8%	4	4.4%	3	5.2%
Total.....	160	100.0%	166	100.0%	91	100.0%	58	100.0%

days of life at the centre, had been convalescing at home from 3 to 22 months.

The personal character ranged from the incorrigible disciplinary type to the over-cautious conscientious type. The average I.Q. (Wechsler-Bellevue Test) was 113 plus. The majority of disciplinary problem cases gave a history of unfortunate home circumstances. Another classification of patients set up by our staff in 1947, describing the vocational aim of an individual on admission here, comprised three main groups: (a) The exploration group, having no vocational objective in mind; (b) The exploration-orientation group, having several ideas but no definite plans; (c) The training group, consisting of those with definite plans.

It is believed that our group of 500 men represents a good cross-section for a tuberculosis study.

or veterans' welfare allowances. The occupational therapist should have the task of organizing recreation and stimulating the development of light hobby activities to occupy suitably the times which might otherwise be restless periods.

It is a well recognized fact that the physical welfare of the rehabilitant is paramount in any rehabilitation program following illness or injury. The supervision of the program, therefore, is best conducted under medical direction, with one or more physicians, depending on the work load. There is no one part of the rehabilitation program where the medical aspect is not the first consideration. The medical staff must keep in mind the importance of each phase of rehabilitation in order to evaluate, or estimate, as accurately as possible, the physical fitness of the man for the immediate and possible future vocational plans.



The rôle of the psychologist may be considered twofold. Firstly, there is the task of conducting psychometric tests, the interpretation of which is presented to the rehabilitation team to assist in the general program. They should not be presented to the rehabilitant except through the rehabilitation team or counsellor after a rehabilitation conference. Secondly, through the interview there is frequently brought to light many psychological problems which have an important bearing on the man's rehabilitation possibilities. Mental anxiety over the physical condition, maladjustments to society, or concern over future employment are occasionally elicited through this office before detection by other members of the staff.

The need for social work, such as dealing with outside problems, has not been great. This does not mean that there are few social problems. However, the majority of such problems in our age group were affected by their early social background or home life. Their difficulties were very deep rooted and only time and association with other people, living together as they do in this centre, would be the best healers. When other information or assistance was required, the facilities available through the Department of Veterans' Welfare services were utilized. It must be remembered too that this is a post-sanatorium institution and some of the medical work was done and social problems were dealt with during the sanatorium period.

The information required for our purpose, to understand what the cause of the difficulties might be, was recorded on files available to us. For these reasons, a staff social worker was not considered absolutely essential.

Vocational guidance, or counselling, was the responsibility of the Veterans' Welfare Officer on the staff. Besides maintaining an up-to-date knowledge of employment and economic situations, it was his responsibility to keep the rehabilitant's training program, or class activities, in line with the possible future vocational plans. He had as his guide the information obtained from the rehabilitation conference, as well as a staff of instructors, to carry out the vocational exploration, orientation or training, as the case may be. There were at his disposal, training and placement advisers (V.W.O.) in the several Department of Veterans' Affairs districts throughout the provinces, who were contacted when the veteran

was about to be discharged to the respective district.

The staff of instructors numbered from 9 to 11. Their's was the task of giving instruction in academic and commercial studies. The technical staff was sufficient to give instruction in automotive, machine shop, woodwork, printing, electricity and radio, drafting and watch making. The equipment was quite adequate to supply complete instruction in each field.

Where facilities were lacking at the institution, outside facilities were not found lacking in educational centres and business and industry. The University of Western Ontario admitted several rehabilitants for as few as 1 or 2 lectures a day, while they were still on patient strength. A few veterans took night classes in local vocational

TABLE II.

<i>Time table</i>		
Breakfast.....	8.00	8.30 a.m.
Relaxation period on beds...	8.30	9.00 a.m.
1. Lectures and instructions....	9.00	9.40 a.m.
2. Lectures and instructions....	9.50	10.30 a.m.
Break period		
3. Lecture and instructions....	11.00	11.40 a.m.
Dinner		
Complete bed rest.....	12.30	2.30 p.m.
1. Lectures and instructions....	2.00	2.40 p.m.
2. Lectures and instructions....	3.00	3.40 p.m.
3. Lectures and instructions....	3.50	4.30 p.m.
Supper	4.45	5.15 p.m.
Relaxation periods on beds..	5.15	6.15 p.m.
Hobbies, review of studies		
recreation.....	6.15	9.30 p.m.
Evening nourishment and		
preparation for bed.....	9.30	10.00 p.m.
Lights off, radios off.....		10.15 p.m.

schools. Many had "instruction-in-industry" in automotive stockroom work, carburetion and ignition, typewriter repair and cash register repair, telegraphy, photography, commercial art, accounting, drafting and others. There seemed to be no limit to the assistance obtained from local business men. Business or professional men also gave time to discuss their own particular field of work to the rehabilitant when the need for such arose.

The physical hardening or post-sanatorium convalescent period is that which covers the gap between discharge from the sanatorium and return to full employment. The duration of this phase of treatment is dependent on the amount and character of the original disease, and the estimated stage of the disease. As it is still impossible to measure an individual's resistance or work tolerance level, a rather general program was adopted.

Tables II and III outline the daily time table and graduated activities. The method of physical hardening was based on a gradual increase in the number of class periods, at the same time reducing the length of the noon rest period. It was a standard policy to review the patient's sanatorium activities in the latter months of stay there, before prescribing a grade of activities. The usual grade for one classed as Quiescent was Grade 2. At the end of two months a routine x-ray, sedimentation rate, urinalysis and medical examination were the rule. If there were no ab-

TABLE III.

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1. <i>Grade of activities</i>	
Grade I.	One morning period and one afternoon period.
Grade II.	Two morning periods and one afternoon period
	OR
	One morning period and two afternoon periods.
Grade III.	Two morning periods and two afternoon periods.
Grade IV.	Three morning periods and three afternoon periods.
Grade V.	Three morning periods and three afternoon periods.
2. <i>Relaxation and rest periods</i>	
(a) <i>Regular periods:</i>	
Rest period	—12.30 p.m. until 2.30 p.m.
Relaxation period	— 5.30 p.m. until 6.30 p.m.
(b) <i>Grade I and II.</i>	
Observe regular rest and relaxation periods. Take one hour or two half hours relaxation periods during the morning, e.g., reading, or working on hobbies, in living quarters.	
(c) <i>Grade III and IV.</i>	
Observe regular rest and relaxation periods. Except in Grade IV—1½ hour noon rest.	
(d) <i>Grade V.</i>	
One hour rest at noon—relaxation after supper.	

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normal findings, one was advanced to Grade 3 activities and so on. In this way, it is 6 months before Grade 5 or full activities at the centre is reached. As minimum, a patient was considered fit to be discharged to do selective work, of a clerical nature, in eight months. This, of course, was dependent on the nature of disease or surgical protection afforded. If the chosen vocation was one requiring longer hours, or more physical exertion, four months, or longer, would be considered advisable on Grade 5 activities.

The plan of physical hardening was designed to give as natural a life as possible. Even with medical supervision, not every man followed the rules of health, nor was every man who committed several offences given disciplinary discharge as readily as most institutions might do. The main objective was to find what an indi-

vidual does and to keep records of his activities, while at the same time keep discipline to a moderate degree.

One does not require much imagination to realize the problems that could arise among 150 men in one institution, particularly when they represent a good cross-section of the population. There were several objections that the patients voiced over the thought of transferring from a sanatorium to a post-sanatorium rehabilitation centre. The general conception of institutional life for the veteran who has undergone treatment for tuberculosis is a regimented regimen (particularly since war service), monotonous routine and lack of privacy.

In considering the problem of regimentation, one has only to remind the complainer that admission is voluntary. If he has any objections to the rules which form a medical prescription describing how to keep well and become physically capable of eventually returning to work or school, he may leave the institution on request. No attempt is made to force a man to remain against his will. With this information provided, invariably it results in the realization that the man is regimenting himself rather than the staff regimenting him. Group talks are beneficial also in explaining the policy of the centre. There are of course, some people who require and accept regimentation.

The "monotonous routine" becomes a forgotten entity when there is a vocational objective. The vocational exploration and training facilities available, both at the centre and with local business firms, did much to alleviate boredom. Living and talking with other men, all discussing future occupational interests, was most advantageous. A noticeable but natural change for the better in the patients' attitude towards rehabilitation took place as facilities increased with time since the inception of the centre.

The feeling of lack of privacy was outweighed by the advantages of the life here. In a study of 255 men, admitted directly from sanatorium—91 married and 164 single—the average stay for married men was 198 days and for single men about 240 days. The married man would have more desire to be living in privacy at home than the single man, yet the average stay would suggest that the advantages of the institution resulted in a desire to complete their rehabilitation at the centre.



There are two main anxiety complexes that develop in most patients which were evident through our experience. First of all there was the fear of relapse of their condition, requiring further sanatorium treatment. The second fear complex was that brought on by the so-called "stigma" of tuberculosis, coupled with the lack of self-confidence in one's abilities. They feared what is termed by them, the outside business and industrial world.

The fear of relapse in some patients was probably never absent. People must have certain fears about health to remind them of the need for planning and conducting a life of moderation in all things. As the patient advanced in his grade of activities, there was an automatic increase in sense of well-being. With rare exceptions, over-exertion even in mild forms was noticed by the person just arriving from sanatorium. It was remarkable how each additional month on prescribed activities increased that sense of well-being and automatically relieved much of the tension regarding attitude towards disease.

The fear of the "outside world" was just as common as fear of relapse. Here again the cure was automatic. As the rehabilitant developed a vocational interest, his mind was preoccupied with the immediate goal. One most important part of the program developed at the centre was the part played by the local firms. In this field the veteran was given a gradual trial on working outside the institution. Our recreational activities, particularly the mixed group activities provided by local girls' groups, also did much to make the patient forget that such a thing as a stigma existed. The manner in which our patient were accepted for employment on their own merits could leave no doubt as to their acceptance generally.

One might suppose that many of these problems could disappear at home. Even the gradual return to work on the part-time basis is possible, but not for everyone, and more important still, not for isolated cases, where homes are a considerable distance from the business centres. It took three years to develop the training with local industry and although well advanced this idea for the benefit of the ex-sanatorium patients was only in its infancy.

Finally, in discussing the actual physical hardening process, it was designed to take place automatically with the increase in prescribed activities. If a veteran was going on to school or

college, he was prepared for such activities and not for tennis or golf as well. If a university course he was planning to take was considered too strenuous, with all the subjects the first year, arrangements were made to divide the first year into two terms. In this way there was a continued gradual increase in activities planned even after discharge from this centre. A man interested more in mechanical field was physically hardened by increased activities in the actual mechanical work. Constant supervision of the workshops was not considered necessary since it was known what a man could do in a specified time. The instructions were laid down specifically leaving this responsibility of supervision to each individual instructor. The fact that a man attended automotive mechanic classes did not mean he would spend his days as such a mechanic. Actually, as an example, 14 stayed close to their interest by being placed in garages as automotive stock-room clerks. The main objective in allowing classes in heavy trades was to help us learn if this was the vocational field in which the man was most interested. Later he was guided to selected work in the field of employment or work that interested him most.

The work expected of a man going directly from the institution to work is described to the physician by the individual, double-checked by the Veterans' Welfare Officer, and the final approval given at a medical conference. In a similar manner, the university curriculum is reviewed before a decision of full, or half-time studies was approved.

#### RECREATION

Recreation for our purposes may be defined as activities other than classroom or workshop studies. There are the bedside activities of hobby-craft, and lounge-room cards and darts, or table games. Motion pictures and discussion groups are among the larger group activities. Ping pong, billiards, shuffle-board, carpet bowling and "5 pin" bowling. Each game was controlled according to estimated exertion. There were inside, or winter sports. Outdoor summer activities consisted chiefly of croquet, lawn bowling and "Tom Thumb" golf. Potography was not the least of spare-time activities. One or two dance evenings were allowed a month, from 8.30 to 10.15 p.m.



A patients' council was formed and from this group, a patients' recreation committee appointed. This committee was responsible to the patients for the organizing of group activities.

TABLE IV.

Distribution of relapses among male veterans who were transferred to Western Counties Veterans' Lodge directly from sanatorium and discharged from the centre by December 31st, 1948. The average time elapsed since discharge from sanatorium—3 years.

Classification of disease	Number of cases	Number of relapses
1. Pleurisy with effusion (unilateral and bilateral) . . . . .	10	1
2. Pulmonary tuberculosis minimal (with or without pleurisy with effusion) . . . . .	26	4*
3. Pulmonary tuberculosis, moderately advanced . . . . .	47	5
4. Pulmonary tuberculosis, far advanced . . . . .	11	0
5. Extra pulmonary tuberculosis . . . . .	0	0
Total . . . . .	94	10
Percentage . . . . .	100%	10.6%

\*Three of these had minimal tuberculosis combined with pleurisy with effusion.

TABLE V.

THE AVERAGE NUMBER OF DAYS OFF WORK DUE TO ILLNESSES, FOR 52 MEN DISCHARGED BY DEC. 31, 1948 AND 57 MEN DISCHARGED DURING THE YEAR 1949  
BOTH GROUPS HAVE AVERAGED OVER 1 YEAR OF WORK OR STUDY AT COLLEGE

Groups	Number of veterans	Total number of months working or at school	Average number of months	Total days sick	Average days sick	Average days sick per annum
1948 . . . . .	52	1,258	24.2	244	4.7	2.3
1949 . . . . .	57	876	15.4	186	3.3	2.6
Total for both groups . . .	109	2,134	19.6	430	3.9	2.4

TABLE V. "A"

CLASSIFICATION OF DISEASE FOR THE TWO GROUPS IN TABLE V WHO HAVE AVERAGED 19.6 MONTHS WORKING OR STUDYING AT SCHOOL OR COLLEGE

Disease classification	No. in 1948 group	No. in 1949 group	Total
Pleurisy with effusion . . . . .	4	1	5
Disseminated tuberculosis . . . . .	3	1	4
Pulmonary tuberculosis minimal . . . . .	15	10	25
Pulmonary tuberculosis moderately advanced . . . . .	20	32	52
Pulmonary tuberculosis far advanced . . . . .	10	13	23
Others . . . . .	0	0	0
Total . . . . .	52	57	109

It is sufficient to say that the bulk of the work invariably fell on the shoulders of the more aggressive rehabilitant. For this reason as a member's class activities increased, time and energy did not permit a prolonged term on such a com-

mittee. Recreation actually served to maintain discipline, keep up or build patient morale, and in many ways assisted in the gradual hardening program.

The institution itself consisted of 11 separate buildings. Eight of them were similar in design and planned for 24 bed pavilions, each with a separate lounge. One large building separately located could be described as the recreation and treatment building. The ground floor contained a swimming pool (not considered suitable for the tuberculosis group) and a medical treatment centre. On the second floor was a large gymnasium. The administrative building, situated opposite this building housed most of the administrative staff, dining room, library, central lounge and other recreational facilities. The original occupational therapy building was converted to a complete woodwork, machine and print shop.

Of the eight pavilions (four on each side, extending away from the central building to form the arms of the letter U) only six were used for living quarters. One was used for commercial and

academic classrooms as well as drafting, watch making and automotive classes. The occupational therapy department was also located here. The remaining pavilion was used for female staff. (Many of the latter were patients' wives).

# DISCUSSION

First, it may be said that as the program developed and facilities improved there was an increase in the number of patients voluntarily accepting this form of institutional rehabilitation. One indication of this fact may be seen in the number of days patients remained at the lodge. There were 79 discharged as "well" by July 14, 1948, with an average stay of 146 days. By the end of the year, December 31, 1948, 160 dis-

here, in that they are directly or indirectly responsible for the causes.

Among 94 men transferred directly to the Lodge from sanatorium, and discharged prior to December 31, 1948, having only one previous admission to sanatorium, and averaging over 3 years since discharge from sanatorium, the relapse rate was 10.6%. Among these 94, there were 55 classed as "complete graduates", (fit to undertake full school studies or work) whose

TABLE VI. No. 1

ONE YEAR FOLLOW-UP SINCE DISCHARGE FROM W.C.V.L. OR TWO YEAR AVERAGE SINCE DISCHARGE FROM SANATORIUM.  
160 MEN DISCHARGED BY DECEMBER 31, 1948 AS "WELL"  
THIS INCLUDES DISCIPLINARY PROBLEM CASES, VOLUNTARY DISCHARGES AND SO-CALLED  
PARTIAL OR COMPLETE GRADUATES

Disease classification	No. of men	No. of reactivations	Well and working	Well but not working, yet fit	No report or nor trace	Declared not fit for work but well
Pleurisy with effusion.....	13	2				
Disseminated T.B. include Bil. Pleur. with effusion	3	0				
P.T.B. minimal.....	53	8	121	23	3	0
P.T.B. Mod. Adv.....	69	3				
P.T.B. far Adv.....	17	0				
Extra-pulmonary.....	5	0				
Total.....	160	13	121	23	3	0
Percentage.....	100%	8.1%	75.6%	14.4%	1.9%	0

One of these is still a chronic alcoholic (age 56).

TABLE VI. No. 2

TWO YEAR FOLLOW-UP SINCE DISCHARGE FROM W.C.V.L. OR THREE YEAR AVERAGE SINCE DISCHARGE FROM SANATORIUM  
160 MEN DISCHARGED BY DECEMBER 31, 1948 AS "WELL"  
THIS INCLUDES DISCIPLINARY PROBLEM CASES, VOLUNTARY DISCHARGES AND SO-CALLED  
PARTIAL OR COMPLETE GRADUATES

Disease classification	No. of men	No. of re-activations	Well and working	Well but not working	No report or trace	Declared not fit for work but well
Pleurisy with effusion.....	13	2				
Disseminated T.B. includes Bil. Pleur. with effusion	3	0	128	10	2	2
P.T.B. minimal.....	53	8				
P.T.B. Mod. Adv.....	69	6				
P.T.B. far Adv.....	17	0				
Extra-pulmonary.....	5	2				
Total.....	160	18	128	10	2	2
Percentage.....	100%	11.3%	80%	6.3%	1.2%	1.2%

charged with an average of 222 days. A group of 164 discharged in 1949 averaged 265 days. These figures include all veterans discharged with a status of complete or partial rehabilitation, voluntary or disciplinary discharges. Those classed as the treatment group are not included.

Another finding, which is not new, is the fact that over-work or over-play were common factors found in our records that suggest the cause of relapse among our group of re-admissions. The mental and socio-economic factors are important

average stay at the Lodge was 259 days. Not one of the 10 men who suffered a relapse had reached this average duration of stay (see Table IV for distribution of relapses according to classification of disease).

In our results to date this trend suggests more evidence of the importance of the time factor, whether during the sanatorium phase of treatment or the post-sanatorium phase. For the benefit of those interested in fitness for work of the ex-patient—Table V and V "A" are pre-



sented. A questionnaire was sent out to 426 veterans but only 200 replies were received in time to make these observations. The average number of days off work or study due to illness was 2.4 days for 109 men who had been working or at college for more than one year. It will be noted that about 20% were those who originally had far advanced pulmonary tuberculosis.

Table VI No. 1 and No. 2 show a comparison of status of the same group on the first year since discharge from the Lodge and the second year respectively. There were more working and a few more re-admissions. The fact that more were working at the end of the second year is indicative of the fact that other facilities outside

#### SUMMARY

The writer is of the opinion that this form of institutional post-sanatorium rehabilitation has a definite place in the treatment of tuberculosis. Although insufficient time has elapsed to draw comparative conclusions, the trends of our results do suggest that several conclusions could be drawn.

1. Such a centre is accepted by both married and single men.

2. There is need for concentrating on the causes of overwork and overplay among sanatorium and post-sanatorium patients and treating the causes.

3. In any rehabilitation program its success depends on the adequate treatment of each

TABLE VI. "A"

ONE YEAR FOLLOW-UP OF GROUP OF 166 MEN DISCHARGED FROM W.C.V.L. DURING THE YEAR 1949  
THIS GROUP INCLUDES DISCIPLINARY PROBLEM CASES, VOLUNTARY DISCHARGE AND GRADUATES  
THE AVERAGE TIME SINCE DISCHARGE FROM SANATORIUM IS 2 YEARS

Disease classification	No. of men	No. of relapses	Well and working or at school	Well but not working	No report or no trace	Declared not fit for work but well
Pleurisy with effusion.....	3	0				
Disseminated T.B.....	6	0	135	15	6	3
P.T.B. minimal.....	33	2				
P.T.B. Mod. Adv.....	86	7				
P.T.B. far Adv.....	35	1*				
Extra-pulmonary.....	3	0				
Total.....	166	9	133	15	6	3
Percentage.....	100.0%	5.4%	80.1%	9.1%	3.6%	1.8%

\*One of the most unfortunate disciplinary cases.

the lodge were still active (Veterans' Welfare Officers).

Table VI "A" compared with Table VI No. 1, is comparable in time. It is interesting to note the lower relapse rate and will be interesting to compare further from the standpoint of duration of treatment and after care. The group in Table VI No. 1, averaged 222 days at the lodge compared with 265 for the later group. Would it also suggest that the greater variety of facilities available (which resulted in less restlessness) the better the ultimate results, not only from the vocational but also from the physical aspect of rehabilitation.

The number of far advanced cases of tuberculosis rehabilitated and remaining well should suggest to us that early work tolerance labelling of patients with advanced disease, may not be a wise procedure. However, time will tell.

phase of rehabilitation and the realization by the members of the rehabilitation team that co-ordination and co-operation are paramount.

4. Adequate treatment consists of adequate facilities for all phases of rehabilitation continuously until the patient is completely rehabilitated.

5. Labelling the patient from the standpoint of future work tolerance during the early phase of sanatorium treatment does not seem advisable.

6. The time factor in the treatment of tuberculosis is probably still the most important and most constant single point to be considered.

#### REFERENCE

1. McKONE, B.: Post Sanatorium Institutional Care in the Treatment of Tuberculosis: *Treatment Service Bulletin* (D.V.A.) 5: 21, 1950.

## OBSERVATIONS ON THE SENSITIZED SHEEP CELL HÆMAGGLUTINATION TEST FOR TUBERCULOSIS\*

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SINCE MIDDLEBROOK AND DUBOS<sup>1</sup> published their report of a specific agglutination test for tuberculosis using sheep cells sensitized with an extract of tubercle bacilli, there have been several investigations concerning its possible value as a diagnostic and prognostic tool for the phthisiologist.<sup>2 to 12</sup> Most writers have concluded that the test is not of practical value. In their original communication, Middlebrook and Dubos stated that they had not yet attempted to determine what correlation there might be between degree of activity of tuberculous disease and agglutination titre of serum. They presented values for six tuberculous patients and some twenty to thirty non-tuberculous persons. They expressed the opinion that the test had a high degree of specificity and cited the low titres of the sera of normal persons as a part of the evidence for this contention.

The work, which is herewith reported, was begun in 1949 and was designed to answer the following questions: (1) What sensitized sheep cell hæmagglutination titre values are encountered in a large series of normal persons? (2) Do all tuberculous people give titres higher than normal persons? (3) Can the titres in tuberculous people be correlated with the extent, activity, and severity of the disease?

### MATERIALS AND METHODS

The agglutination tests were carried out using a modified technique described by Scott and Smith,<sup>13</sup> which employs an old tuberculin in place of the special extract of tubercle bacilli used by Middlebrook and Dubos, with these departures, *viz.*: that streptomycin was introduced into the antigen; and that a mechanical shaker was used during preparation of the serum. Full details have been published elsewhere.<sup>14</sup>

Tests were carried out on the following specimens: (1) A single serum from each of one

thousand blood donors. These sera were secured through the courtesy of Drs. J. P. White and D. A. Squire of the Hamilton Red Cross Transfusion Service. (2) A single serum from each of 500 tuberculous patients, which was obtained within less than two weeks from the date of admission to the Sanatorium. (3) Monthly serum samples, which were obtained from each of 100 patients suffering from active tuberculosis. This collection was continued over a period of a year.

The group of 100 cases thus studied was made up of an average cross section of sanatorium patients. There were 67 males, and 33 females. Pulmonary disease accounted for 92 cases and the classification was divided as follows: minimal 16; moderately advanced 39; far advanced 37. Positive sputum was demonstrated in 86% of them. Complications, present in 38%, included the following: Pleurisy, bronchitis, kidney tuberculosis, spine tuberculosis, testicular tuberculosis, and tuberculous empyema. The disease activity was listed as active A, 18%; active B, 62%, active C, 20%. The disease type was listed as productive, 6%; exudative, 50%; combined, 44%. Cavitation was present in 30% of the cases. The ages of the patients varied from 16 years to 66, the largest group being those 25 years of age and younger. Streptomycin was given to 86% of these people. Major surgical operations including thoracoplasty and resection were done on 26% of the cases. Pneumothorax or pneumoperitoneum was done on 30%. Operations for non-tuberculous conditions such as appendectomy were done in 4%. There were 8 non-pulmonary cases in the study. These included bone disease, hilar gland changes, and pleurisy.

### RESULTS

The results of the first two investigations are presented in the frequency distribution chart, Fig. 1. The majority of blood bank donors had no detectable antibody at all in their sera, and some 68% had so little that it could not be demonstrated after an eight fold dilution of the sera. On the other hand 66% of the sera from the tuberculous group contained large amounts of antibody—quantities which could be detected after a 64-fold dilution or more.

Several of the blood bank donors, whose serum titres were high, were retested about a year later. In almost all instances the new tests gave the same or an even higher reading. It was unfortunately not possible to question these

\*From the laboratories and wards of the Mountain Sanatorium.

persons or to have them x-rayed and skin tested for obvious reasons. It is possible that an occasional donor may have had inactive tuberculous infection; and quite likely that some had received a tuberculin test. This latter procedure leads to the development of antibodies in some individuals.

The records of the 15 sanatorium admission patients (3%), who had no circulating antibodies, were carefully studied. It was found that ten of these although accepted as tuberculous, had never been proven so bacteriologically. One was a case of spontaneous pneumothorax, two were pleurisy with effusion, one a case of an enlarged tracheo-bronchial gland in a child of eleven years, and six were cases of pulmonary fibrosis of varying extent.

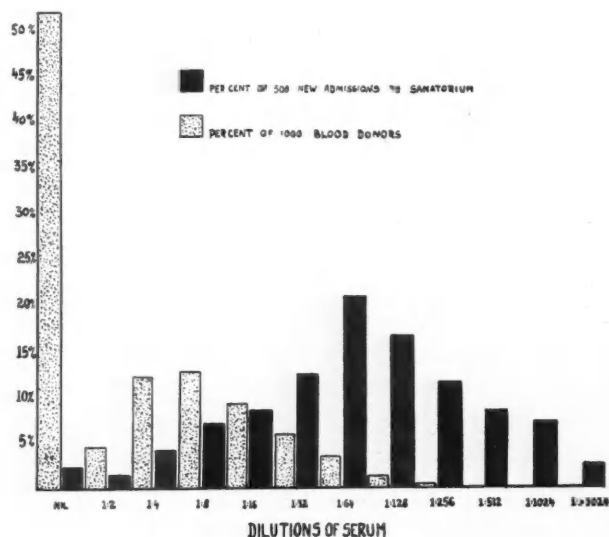


Fig. 1.—Frequency distribution of sensitized sheep cell haemagglutination titres in sera from normal and tuberculous persons. The stippled columns represent values obtained on normal sera; the black columns those on sanatorium patients with tuberculosis. Both groups are plotted on a percentage basis.

The five cases which were proven tuberculous had the following types of disease: (a) One far advanced terminal case (b) two far advanced cases with positive sputum (c) one minimal case with positive sputum (d) one case of tuberculosis of the ovary.

Each of the 100 tuberculous patients, whose serum had been examined at monthly intervals in the third investigation, was studied separately. An attempt was made to correlate the haemagglutination titre with the clinical progress. A graph of the titre levels was prepared to facilitate this study. A representative case is shown in Fig. 2. There was no significant change in the

titre level throughout the year despite the excellent clinical progress of this patient. This was a common finding. In 76 of the 100 cases the graph remained nearly level, but the overall clinical picture was this: improved 67; very little change 28; worse 5.

There was, then, no titre change produced by (1) conversion of sputum from positive to negative; (2) change of activity of disease from active C to active A; (3) the beneficial effects of streptomycin; (4) the effect of operation, even resection.

Nineteen of the cases showed titre levels climbing slightly upwards, and 5% showed a falling trend. However, neither the upward nor downward trends appeared to be related to the progress of the disease. It was also observed

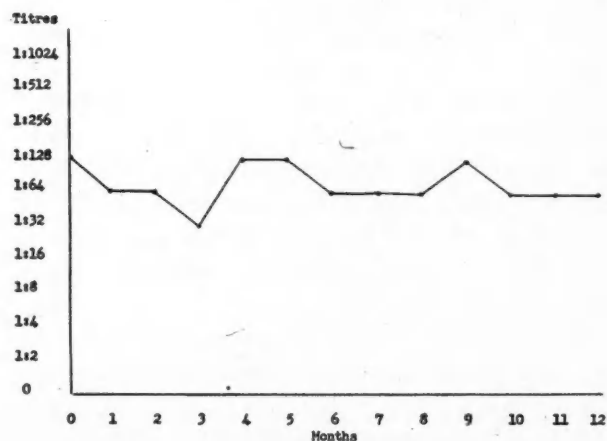


Fig. 2.—Sheep cell haemagglutination titres at monthly intervals of a single case which made excellent clinical progress. This type of graph was representative of 76 of the 100 cases studied.

that the presence of diabetes, lues, and influenzal episodes had no definite effect on the titres. There was no relation to temperature changes, nor to sedimentation rate.

A special series of 7 cases on izoniazid therapy, which were followed for four months, similarly failed to show a change in titre, although some of them showed definite clinical improvement.

The question as to whether extent of disease had any effect on titre is answered by inspection of the scatter graph, Fig. 3. This is composed of the mean titre levels over the one year period. By "mean titre level" reference is made to the average of the titres for each month of the year over which the tests were made. For example, the mean titre level of the case illustrated in Fig. 2 is a titre of 1:64.



Each dot in the scatter graph represents one case; the height at which the dot is placed represents the mean titre level for the year. The graph is divided into three groups representing minimal, moderately advanced, and far advanced pulmonary cases.

It is seen that the overall distribution of titres in the minimal group is lower than that of the moderately advanced group, which in turn is lower than that of the far advanced group. The five small arrows indicate the five cases who showed down-hill progression during the course of the study. They also are placed neither high nor low on the graph.

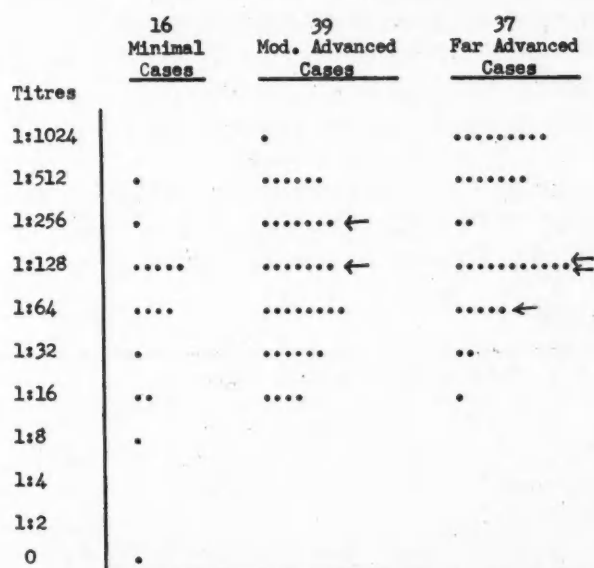


Fig. 3.—Scattergraph of sheep cell haemagglutination titres of 92 pulmonary tuberculosis cases. Each dot represents one case. The height of the dot indicates the average of the titres for each month of the year over which the tests were performed. The arrows indicate the five cases who showed down-hill progression during the course of the study.

### CONCLUSIONS

The majority of normal individuals have either no sensitized sheep cell antibodies in their sera or very small amounts; but a few apparently healthy persons may have moderate quantities. On the other hand tuberculous persons usually have large amounts of circulating antibodies; but a few cases, even far advanced, may have none. As a diagnostic test for tuberculosis, therefore, the estimation of the sensitized sheep cell haemagglutination titre is of limited value since there is a broad zone of overlapping. If, for example, a case of suspected tuberculosis has a sheep cell titre of below 1:8, the chances are greatly in favour of non-tuberculous disease being present. If the titre is 1:64 or above (and

a tuberculin test has not been conducted just prior to the sheep cell test) the likelihood of past or present tuberculosis is great. On the other hand, over the broad band from and including a titre of 1:8 to and including 1:32, conclusions cannot be drawn.

Although there is some slight correlation between extent of disease and height of sheep cell titre, there is none between either activity of disease or progress of disease and titre level.

### SUMMARY

The sensitized sheep cell haemagglutination test for tuberculosis was applied to the sera of 1,000 blood bank donors, to those from 500 newly admitted sanatorium cases of tuberculosis, and to monthly serum samples from 100 cases of tuberculosis for a period of one year.

The sheep cell test is of limited value in the diagnosis of tuberculosis, since some normal persons have moderate to large amounts of circulating antibody, and some tuberculous persons have but little. When the titres are extremely high or low there is strong presumptive evidence for or against the disease.

The sheep cell test is of no value in assessing activity of disease nor can it be used as a prognostic measure.

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### REFERENCES

- MIDDLEBROOK, G. AND DUBOS, R. J.: *J. Exper. Med.*, **88**: 521, 1948.
- SMITH, D. T. AND SCOTT, N. B.: *Am. Rev. Tuberc.*, **62**: 121, 1950.
- ROTHBARD, S., DOONEIEF, A. S. AND HITE, K. E.: *Proc. Soc. Exper. Biol. & Med.*, **74**: 72, 1950.
- SOHIER, R., JUILLARD, J. AND TRIMBERGER, I.: *Ann. Inst. Pasteur*, **78**: 283, 1950.
- FLEMING, J. W., RUNYON, E. H. AND CUMMINGS, M. M.: *Am. J. Med.*, **10**: 704, 1951.
- YOUNG, R. M. AND LEONARD, W. A.: *Am. J. Clin. Path.*, **21**: 1045, 1951.
- KIRBY, M. K., BURNELL, J. M. AND O'LEARY, B.: *Am. Rev. Tuberc.*, **64**: 71, 1951.
- ADCOCK, J., HALEY, R. R. AND DAVEY, W. N.: *J. Lab. & Clin. Med.*, **38**: 736, 1951.
- SPAIN, D. M., CHILDRESS, W. G. AND ROWE, C.: *Am. J. Clin. Path.*, **22**: 86, 1952.
- HENTEL, W. AND GUILBERT, G. D.: *J. Lab. & Clin. Med.*, **39**: 426, 1952.
- BUNN, P., DROBECK, B., GINO, J. AND ADAIR, C.: *Ann. Int. Med.*, **37**: 84, 1952.
- Report prepared by MAHER-LOUGHNAN, G. P. AND HILSON, G. R. F.: *Tubercle*, **33**: 297, 1952.
- SCOTT, N. B. AND SMITH, D. T.: *J. Lab. & Clin. Med.*, **35**: 303, 1950.
- ARMSTRONG, A. R. AND ORLICKI, J.: *Can. J. Med. Tech.*, **13**: 67, 107, 1951.

## BRONCHOGENIC CARCINOMA

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ONE OF THE METHODS of demonstrating progress in Medicine is taking an inventory. This is especially true of progress in the diagnosis and treatment of cancer. In this way results may be compared and evaluated with those from other centres and add to general information, being a basis for future progress.

This paper is a review of lung tumours in the records of Queen Mary Veterans' Hospital, Montreal. The data included cover a period from the opening of the hospital on August 1, 1946, to October 31, 1951; emphasis has been put on an analysis of the results found in the cases of bronchogenic carcinoma.

## TYPES OF NEOPLASM

The types of neoplasm that we have had are shown in Table I. All of these were males; hospital admissions being predominantly male.

TABLE I.

LUNG TUMOURS (1st Aug. 46 to 31 Oct. 51)		
Type	Number of cases	Percentage
Bronchogenic carcinoma	76	76.7
Suspected carcinoma	10	10.1
Secondary malignant	10	10.1
Benign	3	3.1
Total	99	100.0%

From 1946 to 1950 there were a total of 29,293 males and only 935 female admissions. It is a known fact that bronchogenic carcinoma is a disease of older age groups and also predominantly male.

The three benign tumours consisted of a lipoma, a case of recurring tracheal polypi, and a case of bronchial adenoma. The lipoma was a clinical diagnosis, not proven pathologically. The case of recurring tracheal polypi is one being treated at this hospital for a number of years now. This patient has also tuberculosis and is intermittently admitted for fulguration or excision of recurring polypi. There has been no evidence of invasion or metastasis to date. The case of bronchial adenoma was operated upon and died 19 days following a pneumonectomy.

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He will be included in the operative statistics below.

The primary sites of malignant neoplasms with secondary metastases to the lungs were as follows: carcinoma of pancreas; carcinoma of prostate; malignant melanoma-skin; synovial sarcoma in a joint; carcinoma of larynx; seminoma; fibrosarcoma of an extremity; osteogenic tumour; adenocarcinoma of sigmoid; hypernephroma.

Those listed as suspected bronchogenic carcinoma were reviewed clinically and by x-ray. Nine of the cases were definitely not bronchogenic carcinoma. The tenth case was considered to be bronchogenic carcinoma. However, this patient was abandoned as inoperable at time of first suspicion because of an inadequate lung function. Of the 9 cases definitely not bronchogenic carcinoma on review, one was felt to be an infarct, another a tuberculoma, and, of the remaining 7, no definite diagnosis could be entertained as to the abnormal lung shadow or shadows. The latter 7 were classified as benign

TABLE II.

TYPES OF BRONCHOGENIC CARCINOMA		
Type	Number of cases	Percentage*
Epidermoid	36	53.8
Anaplastic	22	32.8
Adenocarcinoma	8	11.9
Two types	1	1.5
Unknown	9	
Total	76	100.0%

\*Percentages are calculated on the 67 cases of known type.

because of no change in x-ray findings over a prolonged period of time.

There were 76 cases of bronchogenic carcinoma. Of these, 9 were definite clinical diagnoses and 67 were pathological diagnoses. Fifty-nine came to post-mortem and 8 did not have a post-mortem; 9 were living at the time this survey was made. The post-mortem rate of the cases surveyed was 92.2%.

The types of malignant tumours found are shown in Table II.

## AGE

The average age of all patients was 58 years. The oldest was 78 and the youngest 33 years old. Ninety per cent of the cases were between the

ages of 40 and 70 years. The average age of the adenocarcinoma group was 60 years, of the anaplastic group, 56 years, and the epidermoid carcinoma group, 58 years. The distribution of age groups is shown in Table III.

#### SYMPTOMATOLOGY OF BRONCHOGENIC CARCINOMA

Particular attention was directed to ascertain whether there was any previous history of disease or symptoms referable to the respiratory system, and if any information could be obtained concerning the silent phase of bronchogenic carcinoma mentioned in the literature by Overholt and others. In addition an analysis of the symptomatology for which the patient was admitted to hospital was made.

There was a record of the presence or absence of previous disease or symptoms referable to the

TABLE III.

AGE ANALYSIS		
Age group	Number of cases	Percentage
20 to 29.....	0	0
30 to 39.....	4	5.3
40 to 49.....	8	10.6
50 to 59.....	29	38.2
60 to 69.....	26	34.2
70 to 79.....	9	11.7
80 to 89.....	0	0
Total.....	76	100.0%

respiratory system in 52 cases of the 72 in this report. Forty-one of the 52 cases (79%) gave a positive history including previous pneumonia, pleurisy or tuberculosis and chronic bronchitis, asthma or bronchiectasis. A very frequent complaint was a chronic cough present for many years, with or without sputum. Of the 72 cases reported, only 15 had a record of x-ray prior to the onset of symptoms heralding the disease. None of the x-rays demonstrated any lesion except one who failed to report for admission. The negative x-rays were taken from 9 days to 5 years prior to admission for their lung cancer. It is interesting to note that 12 of the x-rays were taken within one year of admission and five within 2 months of admission.

The main symptoms complained of by the patient on admission were chosen. The frequency of symptoms of most importance was in the following descending order: cough, pleuritic pain, weight loss, hæmoptysis, and production of

sputum. The duration of symptoms was determinable in 70 cases (92.1%), and it was found the average duration of symptoms prior to admission was 14.2 weeks (approximately 3½ months). Four of the patients had a duration of 2 years which was extraordinarily long. If the latter 4 be excluded, the average duration becomes 8.7 weeks (approximately 2 months).

Ninety-six per cent of the patients had a record of symptoms, the remaining 4% (3 cases) were admitted moribund and no history was obtainable. The symptoms—cough, pleuritic pain, hæmoptysis, sputum and dyspnoea—were considered to be due to the lesion in the lung and were found in the following frequencies: 53, 52, 37, 20, 2% respectively. Eighty per cent of cases presented with respiratory tract symptoms, 17% had symptoms due to direct extension of the primary lesion (superior vena cava obstruction syndrome 2, Pancoast syndrome 2, hoarseness 1, dysphagia 1), or embolic to brain, liver, skin or bone. Most of this latter group (17%) of patients presented with symptoms referable to the metastases and without the presence of respiratory symptoms. Three per cent of the patients presented with symptoms not referable to the malignancy in their lung nor its metastases, but to something entirely unrelated—genito-urinary, gastro-intestinal, oral (sore throat due to carcinoma of a tonsil).

It will be noted that a good percentage of the patients had a history of previous disease or symptoms of the respiratory tract. The average duration of symptoms prior to admission was 2 months. A fact that is not obvious *a priori*, is that only 80% of patients presented with symptoms referable to the lung lesion; 20% of patients on admission complained of symptoms caused by metastases already present (17%) or of symptoms not produced by the malignancy at all (3%). The clinical picture of bronchogenic carcinoma may be bizarre indeed at times.

#### DIAGNOSTIC EFFICIENCY

The speed and accuracy of diagnosis in a case of bronchogenic carcinoma appears to be becoming more and more important in the effective treatment of this disease. It may be redundant but it is important to say, the sooner the diagnosis the sooner treatment can be instituted. At present surgery seems to be the only method of treatment that can possibly offer a cure.



It seems to be unfortunately true that if a diagnosis of bronchogenic carcinoma by history and physical examination alone is self-evident, it is often too late to consider curing the patient by surgery. Complementary investigation included x-ray, bronchoscopy, cell studies for malignancy, biopsy of accessible material not involving thoracotomy and one attempt at thoroscopy.

X-ray studies were most efficient at arriving at a diagnosis and frequently was first to detect the disease. However, further evidence was generally sought prior to thoracotomy. X-ray studies consisted of P.A. studies, obliques, laterals, bronchograms, tomograms and venograms (re, vena cava obstruction) as found necessary. Bronchoscopy results are tabulated in Table IV. Cell studies at this hospital were attempted but to date have not been successful. Biopsies were done in 9 cases, 3 were needle biopsies of the

TABLE IV.

RESULTS OF BRONCHOSCOPIES WHICH WERE DONE IN 45  
OF THE 76 CASES OF BRONCHOGENIC CARCINOMA

	Bronchoscopy Number	Percentage
Negative.....	19	42.3
Positive.....	26	57.7
Total.....	45	100.0%
<i>Positive bronchoscopies</i>		
By biopsy.....	12	
Clinical appearance.....	14	
Total.....	26	

lung lesion. Needle biopsies were found to be unreliable and too risky, but the others were diagnostic and material was obtained from metastases.

The method of arriving at a diagnosis is worthy of study and comparison with other centres. It is a reflection of the efficiency of diagnosis. In 4 cases diagnosis was only arrived at when autopsy was done; in one, no record was present as to the method of arriving at the diagnosis and in the remaining 71 cases diagnosis was arrived at either by positive biopsy, thoracotomy or clinically. The results are outlined in Table V. Diagnoses arrived at on a clinical basis were made by evaluating all the available material, most of the weight of decision being taken from radiological evidence and in some cases from a clinically positive bronchoscopy.

Delay in arriving at a diagnosis was found to be surprisingly high. The average time required

to arrive at a diagnosis, as calculated from the time of admission, was approximately 2.8 months. The shortest time required 1 day and the longest 29.5 months. Approximately 75% of the cases were diagnosed within 2 months and only 27% within 2 weeks. Four cases who died undiagnosed consisted of three who were admitted practically *in extremis*, and one who died

TABLE V.

ANALYSIS OF MEANS OF ARRIVING AT THE DIAGNOSIS OF  
BRONCHOGENIC CARCINOMA

Method of diagnosis	Number	Percentage
Clinically.....	48	67.6
Biopsy positive.....	22	31.0
Thoracotomy.....	1	1.4
Total.....	71	100.0%

5½ months after admission. The latter case had a "Pancoast tumour" and the primary site of the malignancy was not diagnosed until autopsy.

#### TREATMENT AND RESULTS

There were three forms of treatment attempted in the cure or alleviation of this disease, Surgery, x-radiation and chemotherapy. Surgery was used with intent to cure, if possible, by excision of the cancer; the other two were used palliatively. The operability of the cases is outlined in Table VI.

An evaluation of results of operation was made by comparing survival times of the operated and non-operated group (Table VIII). From the

TABLE VI.

OPERABILITY		
	Number	Percentage
I Considered inoperable.....	50	66.0
II Considered operable.....	26	34.0
(a) Refused operation.....	(3)	(4.0)
(b) Had only thoracotomy.....	(12)	(15.5)
(c) Had pneumonectomy..	(11)	(14.5)

figures of both groups combined (Table VII), it is seen that the majority of patients died within 8 months of admission. Of those who lived more than 12 months, there were 3 extraordinary long survivors, 39, 36 and 35½ months. The first 2 had not been operated upon and the last had had a pneumonectomy. The average survival time of the operated group was approximately 3.7 months longer than the inoperable group. The average survival time of those who had pneu-

monectomy compared to those who had only thoracotomy was only 1.7 months better. Operative mortality—if one considers death within 30 days of operation as a criterion—was 4.3% (1 case). This case died 3 days post-pneumectomy of acute pulmonary oedema.

There are 2 cases not mentioned so far in the statistics stated above. They had had thoracotomies and resections for lung lesions whose diagnosis was not made till operation. One was a bronchial adenoma who died 19 days post-operation, cause unknown. The second had a

TABLE VII.

TIME FROM ADMISSION TO DEATH	
Time	Number of cases
0 to 4 months.....	31
4.1 to 8 months.....	16
8.1 to 12 months.....	7
12.1 plus.....	13
Total.....	67

This table does not include the 9 living at end of survey, a number of whom have died since the end of the survey, and in the 67 are included both those operated and not operated.

TABLE VIII.

SURVIVAL TIMES OF OPERATED AND NON-OPERATED GROUPS		
Group	Admission to death average	Operation to death average
Overall.....	7.9 months	—
Inoperable group plus 3 refused operation...	6.7 months	—
Operated (overall).....	10.4 months	6.3 months
Thoracotomy only.....	8.6 months	5.7 months
Pneumectomy.....	14.1 months	7.4 months

resection for a tuberculoma and his post-operative course was uneventful.

The two cases just cited change the above mentioned figures somewhat in two instances. First, the operative mortality becomes 2 cases or 8.6% and secondly, the number of thoracotomies for diagnosis as stated in Table V, becomes 3 or 4.1%. It should also be noted that, of the whole operative group mentioned here the only postoperative complications were 2 cases of broncho-pulmonary fistulae (8.6%).

X-radiation and chemotherapy were the other forms of therapy used. X-ray was used in 16 cases, two of which were postoperative cases. Nitrogen mustard was used in 9 cases and pteropterin in one case. Three of the latter group

of cases were postoperative patients. In some of the above mentioned cases both x-ray and chemotherapy were used. In brief, it may be said that neither form of therapy seemed to affect the course of this disease. An exception to this conclusion may be made with respect to deep x-ray treatment; this caused remission of an occasional anaplastic bronchogenic carcinoma and this only for a month or at most two.

The results of treatment were very discouraging. At the end of this survey there were 9 patients alive, all the rest having died of their disease. Of the 9 cases, 5 had been operated on. Of these, 2 were *in extremis* and died shortly after the end of the survey. They were included in the above mentioned statistics. The remaining 3 of the above mentioned 5 cases had had pneumonectomies and were apparently well at the time of the end of this survey. One was alive 4 years after his operation, in a sanatorium for tuberculosis and showing no evidence of metastases; one who had been operated on in another hospital was alive and well 2 years and 8 months after his operation, also without evidence of metastases; the third had had his pneumonectomy 3 months prior to the end of this survey and was apparently well except for the recent onset of moderate dysphagia which may be the sign of oesophageal involvement by metastases, (Barium swallow so far has been negative). Four cases of the 9 alive were considered inoperable except for one who refused operation. Their histories and course seem pretty much to fall in the pattern described in the statistics mentioned above, even though they were not included in the calculations.

#### DISCUSSION

It would seem fairly certain that the various types of cancer behave differently. They have a bearing not only on the prognosis with and without treatment, but also on the efficiency of bronchoscopy as a diagnostic aid.<sup>4</sup> Average survival times for epidermoid, adenocarcinoma and anaplastic carcinoma are 14.1, 13.6, and 11.4 months respectively.<sup>1, 15, 16</sup> Many of the longer surviving group had epidermoid carcinoma and at autopsy the disease was often limited to the thoracic contents. The best prognosis, post resection, is with the epidermoid carcinoma group.<sup>4</sup> Our findings in post-mortems were occasionally similar and our series seems to show the other factors mentioned above as well.

Age distribution and symptomatology found in our series was similar to that generally described.<sup>4,5</sup> Arthralgia, as a presenting symptom occasionally mentioned,<sup>5</sup> was not found.

Methods of diagnosis reported in the literature are similar to ours, except for the efficiency of diagnosis in some procedures. X-ray is said to be easiest and most efficient in detecting neoplastic lesions in the lungs, especially on mass surveys such as for tuberculosis.<sup>6</sup> This method is effective even in the presymptomatic or silent stage of this disease.<sup>7</sup> Cancer of the lung is the most detectable of internal tumours.<sup>7</sup> Rigler<sup>8</sup> says one can detect a mass 3 mm. in diameter by x-ray of the lungs. Our radiology department has been exceptionally efficient in its work, however, we have been getting our patients too late, practically all in the symptomatic stage. When lesions have been demonstrated suggestive of carcinoma, no thoracotomy has been done till definite proof of neoplastic disease was obtained and this usually took up considerable time.

Bronchoscopy is an efficient means of diagnosis, however, it is much less so in the silent than in the symptomatic stage.<sup>7</sup> It also varies in efficiency with the type of tumour and its location in the respiratory tract.<sup>8</sup> The average highest efficiency found in a short survey was 70% positive.<sup>4</sup> Overholt<sup>7</sup> reported only 3% accuracy—our result showed 57.7%. Cell studies of sputa and gastric washings have been reported with an accuracy as high as 90% if 5 or more sputa per patient are studied.<sup>10</sup> Our results so far have been unreliable. Needle biopsies and thorascopies are only rarely mentioned and probably rightfully so. The former is too dangerous and uncertain and the latter is only of limited use.

Thoracotomy appears to be becoming an accepted means of making a diagnosis. This method is one which enables one to arrive at a diagnosis in the shortest possible time and thereby gives the patient the best possibility of cure by early treatment. Time must not be wasted in attempts to rule out other diagnoses or get positive proof of malignancy.<sup>7</sup> Overholt reports of 191 lesions explored, 72 were tuberculosis, 39 were malignant tumours, 28 were benign tumours and 52 were cysts and other conditions. Johnson *et al.*<sup>9</sup> reported 74% malignant of 53 silent lesions explored. Watson reports 40% malignant of 104 cases of silent lesions. We have had 25 thoracotomies, 8% or 2

of them were benign lesions. The low percentage of benign lesions may indicate a high diagnostic efficiency, but the analysis presented above indicates that we are operating far too late in the course of the disease. Thoracotomy and biopsy should be used more as a means of diagnosis, when necessary to save valuable time. Mortality of thoracotomy today does not make it a formidable procedure.

Efficiency of treatment can only be evaluated if one knows the natural course of a disease. There have been a number of studies published in the last few years on this subject. Buchberg *et al.*<sup>1</sup> report the average life from onset of striking symptoms to be 14.2 months and 8 out of 10 patients died within the first two years. Two per cent lived 5 years or more and the occasional one to 8 years or more. Tinney<sup>2</sup> and Ariel<sup>3</sup> have found the average survival time to be 14.5 and 11.9 months respectively. The same writers state the average survival time after diagnosis to be 9.1, 6 and 6.2 months respectively. These reports cover a total of 975 patients. Poppe<sup>5</sup> found the time between the onset of symptoms and surgery to be about 6 months, ours was found to be the same. Lindkog *et al.*,<sup>11</sup> on the subject of duration of symptoms prior to hospitalization, report 7.9 months, ours was 3.5 months. These authors found that in general the resectable group had symptoms for a longer period than the non-resectable. Similar experiences to those mentioned above were reported by Overholt and Schmidt,<sup>12</sup> Adams,<sup>13</sup> and Lambert.<sup>14</sup>

Results of resection are so far rather discouraging. In a review of 10 medical centres<sup>1</sup> on 7,815 cases, 2,490 (1/3) were operable and 1,239 (1/2 of the operable) were resectable. Of the resected group 5.8% survived 5 years or more; this figure would represent less than 1% of the original group. It will be recalled that 2% of untreated cases live 5 years or more anyway so that the salvage rate so far is pathetically low. Our results are similar to those reported above, 1/3 of our series were operable and less than half of the operable cases were resectable. Our overall survival time from onset of striking symptoms is 11 months, for those inoperable 6.7 months, for those resected 17 months. The latter figure does not include 2 patients who at present are alive and free of symptoms and are possible candidates for 5 year cures. It would appear our results are about the same as reported in the literature and excluding the two above men-



tioned survivors, resection is not aiding our patients; the resected group lived 6 months more than the average survival time and 11 months more than the inoperable group. These figures may easily be accounted for on the basis that the resectable group were a select series early in the course of their disease. However, one must not lose sight of the fact that our two possible survivors are worth the effort to both doctor and patient of resecting those possible.

#### CONCLUSIONS

It may be said that the results of therapy of bronchogenic carcinoma are poor with present methods of therapy. X-ray and chemotherapy are of little if any value and adequate resection early in the disease seems alone to offer some prospect of successful treatment. No adequate series of survivals with resection in the silent stage of this disease has yet been reported. It would seem from a brief review of the literature and of our own experience that in a good proportion of cases, the earlier the resection in the course of the disease and the smaller the primary lesion, the less frequency of hilar and mediastinal involvement and often enough, the possibility of absence of distant metastases. It appears quite evident that not all cancers metastasize early, especially if epidermoid in nature, and these are generally the most frequent. If all cases were adequately resected as early as possible, which means in the silent stage of the disease, then one would have the highest rate of cure at present possible. This rate has yet to be determined.

It follows from the above discussion that rapid diagnosis is essential to the fulfillment of treatment early in the course of this disease. In this hospital we have established a close liaison between the surgical, radiological and medical departments, (each of which is responsibly represented at a weekly chest conference).

It would appear that thoracotomy and biopsy should be resorted to frequently in suitable cases in order to arrive at a rapid diagnosis. The present trend seems to be that, if a lung lesion is still thought to be possibly malignant after a reasonably short period of investigation fails to reveal its etiology, a thoracotomy and biopsy are done. In our hospital, to date, the diagnostic thoracotomy rate has been low. Our patients, as elsewhere, are mostly seen in the symptomatic stage. It would be essential to have patients in the

silent stage of this disease in order to evaluate the possible salvage rate with early surgical treatment. This could be done by a close collaboration with the tuberculosis chest x-ray surveys, and also by an endeavour to make these surveys universal and annual; probably semi-annual in the older age group. To accomplish this it would be invaluable to combine the resources of tuberculosis societies with that of cancer societies and they could combine their publicity to develop such surveys to their fullest extent. In this manner patients could be found in the silent stage and attempts made to adequately treat this disease early in its course.

#### SUMMARY

A review of lung tumours found at Queen Mary Veterans' Hospital from period of its opening to October 31, 1951 is presented. The emphasis is laid on the group of bronchogenic carcinoma. Evaluation of results obtained is compared with those generally reported in the literature and suggestions made as to the possibility and method of improving results.

The author would like to express his appreciation to Dr. W. Mason-Couper for his guidance in the preparation of this article, and to the Tumour Registry of Queen Mary Veterans' Hospital for their assistance.

#### REFERENCES

1. BUCHBERG, A., LUBLINER, R. AND RUBIN, E. H.: *Dis. of Chest*, 20: 257, 1951.
2. TINNEY, W. D.: *Proc. Staff Meet., Mayo Clin.*, 19: 354, 1944.
3. ARIEL, I. M., AVERY, E. E., KANTOR, L., MEAD, J. R. AND LANGSTON, H. T.: *Cancer*, 3: 229, 1950.
4. McDONALD, J. R., MCBURNEY, R. P., CARLISLE, J. C. AND PATTON, M. M.: *J. Thoracic Surg.*, 22: 62, 1951.
5. POPPE, J. K.: *Dis. of Chest*, 20: 75, 1951.
6. OVERHOLT, R. H., WOODS, F. M. AND RAMSAY, B. H.: *J. Thoracic Surg.*, 19: 207, 1950.
7. OVERHOLT, R. H. AND WOODS, F. M.: *New England J. Med.*, 245: 555, 1951.
8. RIGLER, L. G.: *J. A. M. A.*, 142: 773, 1950.
9. JOHNSON, C. R., CLAGETT, O. T. AND GOOD, C. A.: *Surgery*, 25: 218, 1949.
10. FARBER, S. M., McGRATH, A. K., BERIOFF, M. A. AND ESPEAN, L. W.: *Dis. of Chest*, 20: 237, 1951.
11. LINDSKOG, G. E. AND BLOOMER, W. E.: *Cancer*, 1: 234, 1948.
12. OVERHOLT, R. H. AND SCHMIDT, I. C.: *New England J. Med.*, 240: 491, 1949.
13. ADAMS, R.: *J. Thoracic Surg.*, 17: 306, 1948.
14. LAMBERT, A.: *Am. J. M. Sc.*, 215: 1, 1948.
15. KOLETSKY, S.: *Arch. Int. Med.*, 62: 636, 1938.
16. GEBAUER, B. W.: *J. Thoracic Surg.*, 10: 373, 1941.

Accidents are a problem of increasing importance to modern society. During 1950, there were 90,000 deaths in the United States from this cause. Accidents were the fourth leading cause of death among the total population of Minnesota during 1950, and the most frequent cause of death among persons 1 to 34 years of age, being responsible for more deaths than neoplastic diseases, convulsions, and diseases of the central nervous system, heart disease and rheumatic fever, congenital malformations, pneumonia and influenza combined.—J. J. DeCosse, *New England J. Med.*, 248: 837, 1953.

BEHAVIOUR PROBLEMS  
IN CHILDREN\*PAUL WILLIAMSON, M.D.,  
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THIS IS A BRIEF DISCUSSION of some common deviations of behaviour in children that are frequently quite alarming to parents. It is imperative that the good family physician be able to explain these and equally imperative that he take time to do so. In the discussion to follow no pathological deviation in behaviour is implied. The explanations are those that apply to the average normal child.

1. *Lying*.—Frequent lying on the part of the child is usually a defense against "snoopy" parents. A child, like anybody else, wishes and has a right to have a degree of privacy about some of his actions. Parents should realize this fact and should not make unreasonable demands for explanation of each trivial action. One of the most important in causation of lying is non-acceptance of the answer which is given. When a child finds paternal disapproval of his answer he is most likely to try other answers until he finds one which is "approved by the authorities".

Parents should be warned not to ask a child a question unless they are prepared to accept without question the answer given. Let us take an example of this: the child should not be asked "What did you do with your hat?" unless the parent is willing to accept whatever answer is given. The same final result can be gained by a flat statement on the part of the parent such as "You came home without your hat".

Remember that the child will resent what he feels is too great a degree of prying on the part of the parents and will show that resentment by lying. Intelligent handling of the problem can stop the majority of such behaviour in a very few short weeks. This is not intended to mean that a gross and deliberate falsehood is not worthy of punishment.

2. *Fear*.—Most fear is learned. We parents purposely instill the fear of fire and fear of injury into our children so that they may be protected. In doing this, however, we should take into account that it can be grossly overdone. If the child is taught to have a morbid fear of half a dozen things around the house he is quite likely to expand that fear to include other things

that come to his attention. For example, fear of the dark is a learned fear.

There is nothing at all wrong with the average child who has expanded the fear already instilled in him by his parents to cover unfamiliar subjects. In most cases a simple but quite thorough explanation on the part of the parents is all that is needed to stop this fear. It certainly is wise to take well into account that some little time is needed for the child to determine for himself what should and should not be feared and that he has no instincts at all to guide him. It is entirely a process of learning by experience.

This learning can be accelerated by sympathetic understanding on the part of the parents. The opposite also obtains, however, that learning can be greatly slowed down by harsh criticism rather than understanding by the parents. The answer is a simple and frank explanation delivered just as often as necessary to convince the child.

Parents frequently mistake anger for fear. An example of this is the child who doesn't want to go to bed at night and who has a modified temper tantrum each time he is put to bed and the light turned off. This is certainly no indication of fear on the part of the child and the parents should be reassured.

There is a difference between the sound of a fear cry and a temper cry. Mothers should be encouraged to learn this difference and to base their decisions of what to do about a particular behaviour trait on knowledge of the type of cry which has been used.

Most mothers are resistant to the idea that their own little darling is not particularly afraid but is just raising hades in general. This resistance can be overcome—though not easily—by the family doctor. An example of this fear-anger mixup which we see every day is the child who throws a temper tantrum every time you put him on the examining table. I confess that I often feel that the flat of the hand properly applied would do much to stop this behaviour but I have not as yet been able to determine whether the flat of the hand should be applied to the child or to the mother. If the determination be made we will let you know.

3. *Stealing*.—It is impossible to give a child a legal education *in utero*. We will admit, too, that seldom are children born with an adequate sense of legal property rights. To the average child, the easiest way to get something is to take it.

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Any other process seems to him a lot of needless discussion and needless negotiation that could well be avoided simply by picking up the article and walking off with it. This is entirely normal behaviour. There is no reason at all for shock on the part of the parent when young children exhibit this tendency to ignore the property rights of others. Repeated explanations to the child, rewards for good behaviour, and occasionally an intimate acquaintance with the hairbrush will do much to clarify the situation for all concerned.

So that we may understand completely, stealing is a *learned* art. No child is smart enough to learn the art in a very few years. He simply doesn't know property rights and therefore takes what he wants without discussion. This is not bad from his standpoint. He does not face—as we would under similar circumstances—the possibility of getting caught. He doesn't care whether or not he is caught for he simply saw an article that he wanted and took it.

4. *Temper.*—Anger is a natural emotion and is seldom resented as such. Parents are more likely to become alarmed at the method taken to show anger than at the existence of the actual anger itself. In children under 10 years of age the temper tantrum or a modified form of it is quite common. It is simply an uninhibited form of anger. There are times in all of our lives when we would like to beat the floor and chew the rug but we have learned that the rug doesn't taste good, that our friends resent us beating the floor, so we don't. A child hasn't learned this.

There are many ways of handling a temper tantrum but some points are paramount. The first is that the child may not be using the tantrum as a means of torture for the parents. He may, instead, feel that he has been denied something that was obviously due him and feel quite justified in his anger. He doesn't particularly care whether anyone else feels that he is justified or not. Unfortunately, it is quite possible that he may have found out that if he yells loud enough and long enough he will be granted whatever he wishes. In this case, he simply decides whether or not the gain is worth the physical exertion.

Sympathetic understanding of these two possible viewpoints by the parent will do much at least to aid in understanding the reasons for the temper tantrum. Understanding doesn't make it any easier to bear.

5. *Obedience.*—This, too, is learned behaviour. It is not acquired rapidly and parents should be told to expect that some time will be consumed in learning the art. Isn't it rather amazing that the army finds that it takes six weeks to train a full-grown adult in the art of unquestioning obedience and yet, most of us expect our children with no past experience automatically to be obedient?

Disobedience can arise from a number of sources. The foremost, of course, is ignorance of the art of obedience. The next most frequent cause is an overdose of rules and regulations forced upon the child by the parent. A child is not only lucky but quite intelligent if he can remember and exercise strict obedience in eight or ten situations. Frequently, we parents expect them to exercise the same obedience in over a hundred situations. This simply will not work. Deliberate disobedience in this situation may be a form of resentment by the child against the too great exercise of paternal authority. The child is right and the parents wrong.

When a particular subject requiring obedience comes up for discussion the child should have a frank explanation and the parent should be sure that the child understands what the punishment will be if he disobeys. Let me emphasize that this understanding should come before disobedience, not afterward. In the event that the child disobeys with this full knowledge then the punishment should be executed exactly as promised.

Probably the most frequent cause of trouble in this field is irregular discipline. In some homes the child may catch the very devil for doing something one minute and be completely undisciplined the next. This is just as confusing to the child as it is to the parents and contributes to the establishment of a completely unmanageable situation. Our advice would be to choose only a few acts for illustration of necessary obedience and then to demand obedience in these fields.

It is an interesting fact that many children are "spoiled rotten" because parents believe firmly that the development of the child will be inhibited if he is curtailed in any way. I don't know whether this is true or not, but I do know that every person must learn to obey sooner or later and to conform where necessary. It would seem less painful to learn this below the age of



10 when adaptability is at its height rather than at a later age.

You can certainly tell the parents who consult you that, without regard to which side of the current controversy is right, the child is going to have to learn some time in his life that duly constituted authority must be obeyed. When he learns it may be in part up to the parents but he *is going to learn it*.

The problem of disobedience can be met by the firm but understanding parent who will help the child learn an art. It can never be solved by rigid demands that go beyond what a child has already learned.

6. *Dependence*.—Most children grow up physically and nearly 50% of them grow up emotionally. We all have splendid examples of this fact in our own acquaintance. It is fortunate that emotional development may occur in spite of the parents as well as with their help. Did you ever see anything more ridiculous than a gangling 12-year-old boy who could beat his mother to death with his little finger and who is reading the theories of Einstein as light entertainment being called "my darling baby" by an adoring mother?

The process of growing up begins to be manifest to the naked eye between the ages of two and three. At this period the child gives some slight evidence of wanting a little bit of his life to be all his own. He may wish to play alone occasionally. There are tasks about the house which he feels are his and he would like to be allowed to do them in his own way.

Such self-assertion may take many forms. Within the normal bounds of discipline the child should be given certain opportunities to assert himself as an individual early in his life. He should be allowed to have certain preferences of his own without criticism and he should be encouraged to develop the life routines that he likes best insofar as his selection fits in with the rest of the household.

All children like to be loved and need to be. Like anything else it can be carried too far. Many doting mothers make fools of themselves in overcompensating for hostilities by "loving a child to death". You must be very polite in saying so and you can't give it as advice, but some mothers need to be told: "Go ahead and grow up *with* your child. You may find it interesting all the way through."

7. *Jealousy*.—Parents seldom bring a child to

the physician complaining only of jealousy but they frequently worry a great deal about jealous acts on the part of their children. There is little reason for this worry. Jealousy is normal in a growing child.

The best means to combat it is to build for each member of the family a niche peculiar to him and to admire him for his own traits, not force him to ape others. Let us take an example. All children in a family seldom are athletically inclined; those who are not may have traits just as admirable which could be developed and which could be a source of family pride. Each child is enough of an individual to earn a place for himself if allowed to do so and the family should foster these individual differences as a means of combating jealousy.

In the presence of a grossly unfair parent that shows a great deal more affection for one child than another, jealousy is to be expected. In such a case the child is right and the parents wrong. Much can be done in these instances by having a frank talk with the parents.

8. *Punishment*.—We certainly believe most firmly that there is nothing wrong with the flat of the hand properly applied. There is, however, an art to beating a child. Those who undertake it should at least be conversant with the basic principles of the art. The punishment will need to be both short and effective. If you are going to hit a kid, hit him. Don't give him a love tap and a frown. The punishment should be related in time just as closely to the offense as possible and should not be administered in anger.

I think that one of the most important points to remember is that anger has no place in the administration of punishment. The parent who vents his own spleen on a helpless child is doing irreparable harm to the child and is himself behaving poorly enough to warrant punishment. Equally foolish, I believe, is the parent who believes that no punishment is needed. People, throughout their lives, are faced with the possibility of punishment for improper acts and it is wise for the child to learn early in life that he faces the same problems.

You will find a statement in Holt's "Bible of Pædiatrics" that goes something like this: "Rewards are much more effective than punishment, a fact more generally appreciated by animal trainers than parents." This is true. Attempts should be made to gain good behaviour by means of proper rewards rather than by means of dire

threats. Incidentally, never threaten a child with anything that you are not prepared to carry out. He'll dare you a few times just to see whether you're bluffing. Never let him know that you might refuse to take his dare.

In summary, these are some common behaviour problems found in reasonably normal

children. This is not meant to be a weighty discussion of the matter, but I believe that the principles mentioned will be of some help in paediatric practice. Do take time to talk to parents about these things. They are frequently of a great deal more importance than the minor physical illnesses to which children are subject.

### THORACOSCOPY AS A DIAGNOSTIC PROCEDURE IN PULMONARY TUBERCULOSIS

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SINCE THE STATEMENT of Singer in 1924 that by thoracoscopy "can be seen . . . small areas of pathological change that need attention", the author has been unable to find any publications concerning thoracoscopic observation of the lung tissue itself as distinguished from observation of adhesions. My interest in examining pathological changes in the lung tissue by thoracoscopy has grown with the increase in popularity of resection therapy in the surgery of pulmonary tuberculosis.

Having in mind the observation that in pulmonary tuberculosis changes are frequently found in the peripheral, even subpleural levels of the lung, one would certainly expect to obtain valuable information by thoracoscopy, that will supplement the important but nevertheless incomplete information which it is possible to obtain by x-ray. This point stimulated the author to meticulous observation and recording of the pathological changes in lung tissue, as they were visualized at the time of thoracoscopy. These observations involved the pleura, the subpleural tissues, the glands of the hilar region and the interlobar spaces. Attempts were also made to determine the consistency of the lung segments by the use of a blunt instrument, that allowed one to test the elasticity of the tissue examined, without danger of damage to the lung.

#### METHODS AND MATERIAL

Two cannulas were used in all cases, irrespective of whether pneumonolysis or simple thoracoscopy was contemplated. The Coryllos thora-

coscope was used in all examinations, with direct and lateral viewer, the latter being also utilized as a transilluminator. The patient's position was changed frequently in order to provide a satisfactory view of all possible parts of the pleural cavity. The lateral viewer was used, in addition, as a blunt instrument, to move individual lobes and to determine the consistency of involved or suspicious lobes or segments. As indicated above, this latter manoeuvre is of great value in ascertaining the status of lung tissue. Healthy lung tissue, when compressed, quickly returns to its original shape. Diseased lung tissue behaves remarkably like oedematous skin, with somewhat similar pitting on pressure, and may reveal in addition, evidence of atelectasis, change in colour, retraction, and depression below the surface of the healthy lung tissue. Furthermore, lung segments involved by disease move passively, but not actively, with healthy lobes or segments, on respiration. This latter feature is readily observed, and is sometimes striking.

Written and pictorial reports were provided after each operation. In the 114 cases examined, these observations were carefully compared with x-ray films taken as close as possible to the time of operation. In addition in 13 cases in which lobectomy was subsequently performed, the findings of thoracoscopic examinations were carefully compared with the surgical specimens.

This study extended from November, 1949 to December, 1951, during which period 114 thoracoscopic examinations were carried out on 92 patients, of whom 35 were male and 57 female. In the group were one negro and one mulatto. All others were white. The patients ranged in age from 14 to 53 years. Of the 114 operations, 90 intrapleural pneumonolyses were done. In the remaining 24, thoracoscopy only, was carried out. In one patient the diagnosis was not established; of the remainder all had pulmonary tuberculosis with the following radiologic classifications:

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minimal, 16; moderately advanced, 46; far advanced, 29. Of the far advanced cases, 2 were complicated by chronic empyema of long duration.

The time interval between the induction of pneumothorax and the performance of thoracoscopy was somewhat variable. In the vast majority of cases, this period varied between 4 weeks and 7 months, and 60 of the 114 operations were done 4 to 8 weeks after the initial pneumothorax. Five operations were done between 4 and 14 days after induction of pneumothorax, a time interval which proved to be perfectly safe. Six operations were done two years after induction of pneumothorax, merely because they presented themselves for treatment at that late date.

One patient underwent thoracoscopy 9 years after induction of pneumothorax, to establish whether the radiological findings represented an intrapulmonary cavity or a chronic empyema with bronchopleural fistula. In this case thoracoscopy revealed an old empyema pocket. The patient was cured by intercostal drainage with penicillin and streptomycin lavage followed by a limited thoracoplasty.

The findings in this group of 114 thoracoscopic examinations fell naturally into 4 categories.

	Cases
A. No abnormal findings .....	34
B. Thoracoscopic findings closely similar to radiographic findings .....	21
C. Abnormal thoracoscopic findings somewhat more extensive than radiographic findings ....	36
D. Abnormal thoracoscopic findings much more extensive than radiographic findings or of an entirely different nature from those suspected by x-ray examination. ....	23

From these figures it appears clear that x-ray findings were reasonably accurate in 55 cases (49%), but that in the remaining 59 cases (51%) thoracoscopic examination provided information which was unobtainable by x-ray. This in itself is a strong point in favour in more frequent employment of thoracoscopy as a diagnostic procedure, rather than a purely therapeutic one, in the management of pulmonary tuberculosis. This impression was strengthened by an analysis of the 13 cases in which thoracoscopy was followed by lobectomy, thus permitting a comparison between the thoracoscopic findings and the results of examination of the surgical specimens. In 7 of these 13 cases the findings at thoracoscopy were much more in

keeping with the pathological findings than were the results of x-ray examinations.

The following illustrative cases have been selected to particularize the generalizations submitted above:

#### CASE 26 (See Fig. 1)

Mulatto male age 21. Left pneumothorax initiated for diagnostic purposes. Sputum positive. X-ray studies with planigraph and lateral films revealed parenchymal infiltration in the posterior portion of the left lower lobe, inner zone, suggesting partial atelectasis and also cavity formation; posterior segment of the lower lobe involved. The area of disease appeared not larger than 1/10 of the lower lobe.

*Thoracoscopic examinations.*—Upper lobe normal. Lateral basal segment of lower lobe, blue atelectatic, with superficial tuberculous changes visualized through the pleura. After using lateral viewer through the second cannula and pushing the upper lobe aside it was seen that about 1/2 of the lower lobe was involved by tuberculosis.

*Pathological examination.*—Most of the lung tissue of the lower lobe atelectatic. Only small mediastinal segment normally aerated. There was inflammatory consolidation of a bronchogenic type, apparently tuberculous in nature. Two small tuberculomas, each about 1 1/2 cm. in diameter, one eroded into a bronchus. Two caseous lymph nodes about 2 cm. in diameter in hilar region. No cavity found.

In this case x-ray showed not more than 1/10 of the lower lobe to be involved. Thoracoscopy revealed 1/2 of the lobe involved. Pathological examination showed almost the entire lower lobe to be occupied by tuberculous changes.

#### CASE 27 (See Fig. 2)

White female, age 33. She had had left pneumothorax 1943 to 1946 and right pneumothorax for past 16 months because of reactivation of disease in the right lower lobe with positive sputum. Shortly after pneumothorax was started sputum became negative, but she had a persistent atelectatic area in the right lower lobe that was fluctuating in size, lately enlarging; nevertheless the size as visualized by latest x-rays was never more than 1/10 to 1/8 of the lower lobe.

*First thoracoscopy 3 months after pneumothorax was initiated.*—Contracted, atelectatic, fibrotic subsegment with tuberculous changes situated between posterior and superior segments of the lower lobe. X-ray at that time showed shadow corresponding to that visualized by thoracoscopy.

*Second thoracoscopy 11 months later* when x-ray shadow increased in size, but not over 1/10 to 1/8 of the lower lobe: Fibrotic, bluish-grey, tuberculous changes in the postero-basal segment of the lower lobe, but in addition, the lower lobe almost wholly atelectatic. The whole lobe was moving passively with the upper and middle lobes but not "breathing" by itself.

*Pathological examination.*—Atelectatic tissue, bronchiectatic channels in the whole lower lobe with spheroidal mass of consolidation 2 inches in diameter in the lower segment.

#### CASE 56 (See Fig. 3)

White male, age 34. Diagnosis not established. This patient was admitted to hospital in December 1949, after he had had virus pneumonia (?) treatment at home, and after his x-ray suggested minimal tuberculosis. Tuberculin test was positive, sputum negative. Because diagnosis was unclear thoracoscopy was done 10 days after induction of pneumothorax.

X-ray showed a small shadow in the right apex not larger than 1/10 of the upper lobe, but thoracoscopy revealed 2/3 of the right upper lobe coal-black, leathery



and atelectatic. No superficial tuberculous changes were seen. It was thought to be tuberculosis or neoplasm.

The patient was transferred to a general hospital, for further investigation and possible resection of the right upper lobe.

**Bronchoscopic examination.** — Granulomatous changes in the right upper lobe bronchus. Bronchoscopist was convinced that the changes were tuberculous. Culture of sputum revealed mixed respiratory flora; no tubercle bacilli.

**Pathological examination of the bronchoscopic specimen.** — Squamous metaplasia of bronchus. Simple non-specific chronic inflammatory process. The patient returned to the tuberculosis hospital, where he received 95 gm. streptomycin and 1,200 gm. PAS.

Subsequent bronchoscopic examinations showed clearing of the abnormalities in the right upper lobe bronchus. X-ray showed small linear scar in the right apex with no evidence of recent infiltration or atelectasis.

**Second thoracoscopy 7 months after the first.** — Right upper lobe appears normal. Two small spots 1 cm. in diameter in extreme apex.

In this case in which diagnosis was not established, tuberculosis and fungus disease not excluded, the x-ray findings were quite different from those seen by thoraco-

scopy, in that x-ray showed 1/10 of the lobe to be involved, while thoracoscopy revealed involvement of 2/3 of the lobe.

#### CASE 45

In this case thoracoscopy indicated that lobectomy was inadvisable because of extensive mediastinal tuberculosis. Because this opinion was not considered reliable, thoracotomy was done, only to find that the thoracoscopic observations were correct and lobectomy was impossible. This patient later underwent thoracoplasty.

#### DISCUSSION

The cases illustrated above emphasize the frequent gross disproportion between the extent of disease as indicated by x-ray and that revealed by thoracoscopy or examination of surgical specimens. For example in cases 26, 27 and 56,

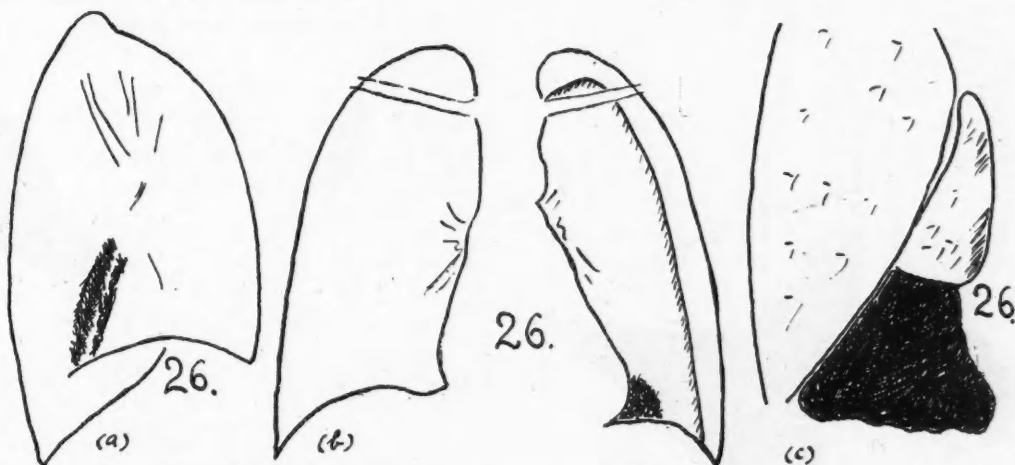


Fig. 1.—(a) Changes in lateral x-ray. (b) changes in PA x-ray. (c) Changes in thoracoscopy.

scopy, in that x-ray showed 1/10 of the lobe to be involved, while thoracoscopy revealed involvement of 2/3 of the lobe.

#### CASE 88.

White female, age 28. Pulmonary tuberculosis, far advanced, active, open. Multiple cavities in the right upper lobe. This patient with mental disturbances had had right pneumothorax for a few months, abandoned by herself. After readmission to hospital right pneumothorax was reinitiated and 3 months later, pneumonolysis was done under general anaesthesia. In view of the mental status of the patient, right upper lobectomy was considered, despite great improvement.

Thoracoscopy, however, showed a puzzling picture: Despite the x-ray appearance of multiple cavitation in the upper lobe no thoracoscopic changes were found in upper or middle lobe. But in the lower lobe considerable changes were found, with an atelectatic area involving the whole apical segment of that lobe and part of the segment below. PA and lateral x-rays did not show these changes.

Tomography, done because of the findings at thoracoscopy, revealed changes in the lower lobe but not as extensive as those seen by thoracoscopy. The general condition of this patient was not satisfactory for pneumonectomy, and further surgery was cancelled.

In this case thoracoscopy failed to corroborate the

radiographic examination, including tomography, indicated involvement of 1/10 to 1/8 of a lobe. Thoracoscopy in the same cases revealed involvement of 1/2 to 2/3 of a lobe; while examination of the surgical specimens in 2 of these cases indicated that the disease process involved almost the entire lobe or lobes.

This, of course, emphasizes the well-known fact that the x-ray does not always reveal all changes in the pulmonary parenchyma, particularly areas of disease which are not large enough to cast radiographic shadows, or areas hidden by the shadows of solid tissues such as mediastinal organs. In such cases as these, as well as others, equivocal indications for lobectomy are rendered more positive by the procedure of thoracoscopy.

In other cases, thoracoscopy has provided important information in connection with localization of involved areas, as distinct from their size.

For example, in one case, in addition to upper-lobe cavitation, there was involvement of the lower lobe, which was not visualized by x-ray. This information led to abandonment of plans for upper lobectomy, and made it unnecessary for the patient to undergo exploratory thoracotomy to obtain the same information.

In another instance, the recommendation after thoracoscopy was that the case was inoperable for lobectomy. However, despite this, exploratory thoracotomy was carried out, only to corroborate the thoracoscopic diagnosis. It is clear, therefore, that intelligent application of the procedure of thoracoscopy may well save many

cedures of dye injection and intrapleural manometry. It should be stressed that thoracoscopy is a single diagnostic procedure, and, as such, will not provide all the answers in all cases. This note of caution, however, is equally applicable to any other single diagnostic procedure in any branch of medicine. One should emphasize also, that negative findings should be treated with extreme caution.

However, it seems clear that thoracoscopy is of great value as a diagnostic procedure and that its indication should be expanded to a degree where it will be much more widely utilized than has been the case in the past.

#### SUMMARY AND CONCLUSIONS

1. The results of observations in 114 thoracoscopic examinations are presented.

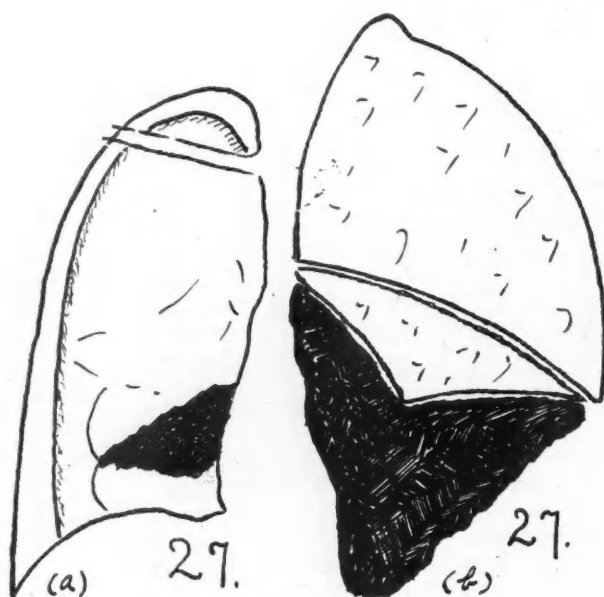


Fig. 2.—(a) Changes seen in PA x-ray. The lateral x-ray did not give any information. (b) Changes seen by thoracoscopy. The whole lower lobe involved.

patients from undergoing extensive and unnecessary surgical procedures.

In another case, with a huge cavity, Monaldi drainage was indicated as a preliminary to thoracoplasty. In this case, thoracoscopy was of great value in determining the safest site for insertion of the catheter. This patient responded very well to cavity drainage and subsequent thoracoplasty. In still another case, it was obvious that thoracoscopy provided the differentiation between an intrapulmonary cavity and an old empyema, a distinction which had been impossible by all forms of radiographic examination.

Thoracoscopy was of value in the diagnosis of bronchopleural fistulas which had not been demonstrable by the more time-honoured pro-

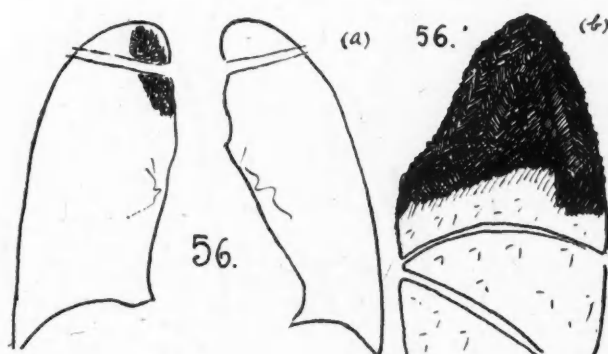


Fig. 3.—(a) Changes seen in PA x-ray. (b) Changes seen by thoracoscopy.

2. It is emphasized that thoracoscopy should be more widely used as a diagnostic procedure rather than purely as a preliminary to adhesion-section.

3. Thoracoscopic findings are compared with x-ray examination and with examinations of surgical specimens removed during resection procedures.

4. Illustrative cases are presented.

This paper was prepared on the observation of patients at the Halifax Tuberculosis Hospital, of which the author was a member of the Staff at the time. I wish to thank Dr. C. J. W. Beckwith, Superintendent, for permission to publish this observation. Also Dr. S. J. Shane, Superintendent of Point Edward Hospital, Sydney, N.S., for his assistance in preparing the manuscript for publication.

#### REFERENCE

1. SINGER, J. J.: *Am. Rev. Tuberc.*, 10: 67, 1924.

## TOXICITY STUDIES ON SOME NEWER LONG-ACTING LOCAL ANÆSTHETICS\*

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FOLLOWING SURGICAL PROCEDURES it was felt that the prevention of pain in an incision by the use of a suitable long acting local anæsthetic, might facilitate recovery by contributing to the patient's comfort, and also by permitting and encouraging him to move about more freely. It has been noted that patients who are active physically following hernia surgery recover more rapidly than those confined to bed.<sup>1</sup>

Some products for providing prolonged anæsthesia have been marketed. In this study we began an investigation of these to determine, first, whether the claims for these could be substantiated; second, whether any local manifestation would appear following injections of these into animals; third, whether better preparations could be formulated.

### METHOD

The method adopted was to inject the preparation under test into suitable areas on the shaved backs of white guinea pigs weighing 400 to 500 gm. Injections of test solutions were made on one side of the mid-line; injections of physiological saline were made on the other side to serve as a control. The degree and duration of anæsthesia were estimated in our experiments by noting the animals' response to a light touch of a pin point in anæsthetized and unanæsthetized areas; areas were tested at least once every 24 hours since our interest lay mainly in a local anæsthetic having a longer duration than this period. The amounts used for subcutaneous injection were 2 c.c. and 1 c.c. of the test solution or suspension; 0.1 c.c. was used for intradermal injections to determine whether harmful effects such as ulceration and sloughing of the skin might follow. Normally local anæsthetic preparations are not administered intradermally but when long acting preparations are placed within wounds contact may be made with the skin and there may be interference with the healing process. The question of species specificity with respect to skin reaction to these local anæsthetics was further investigated by injecting them into other animals such as the rat and the rabbit. Since undesirable local damage to muscle is possible when a local anæsthetic is employed in surgery for hernia, intramuscular injections of 0.5 c.c. were made into the quadriceps muscle of the hind limbs of guinea pigs. In all experiments histological studies were made on excised tissues. As the occasion demanded small injections were made subcutaneously in man to determine local toxicity of various preparations or individual ingredients.

Magnification in photomicrographs was varied, being adjusted as necessary to bring out the details of the different reactions.

\*Read at the meeting of the Academy of Medicine in The Section of Anæsthesia, Toronto, Ontario, November, 1952. From the Department of Pharmacology, University of Toronto and the Research Division of Shouldice Surgery.

### RESULTS

The commercial preparations used are listed in Table I showing their compositions. In three of the preparations procaine base is the common local anæsthetic used. The typical gross effect observed upon subcutaneous injection of the various preparations was a red thickened reaction. The area injected intradermally showed yellow ulceration with indications of sloughing.

Duracaine was slightly different in that intradermally only a slight red reaction occurred. However, upon histological examination of the injected skin area considerable damage was

TABLE I.

COMPOSITION OF COMMERCIAL PREPARATIONS	
<i>Duracaine:</i>	
(pH 7.3; 1-8 days).....	
Procaine base.....	2%
Merthiolate.....	1:5000
Methocel.....	0.5%
Al (OH) <sub>3</sub> gel.....	2%
Distilled water.....	q.s.
<i>Proctocaine:</i>	
(pH 8.4; 8 days)	
Procaine.....	1.5% w/v
Butyl-p-aminobenzoate (Butesin).....	6% w/v
Benzyl alcohol.....	5% w/v
In oil.....	
<i>Efocaine:</i>	
(pH 8.9; 9-22 days)	
Procaine.....	1%
Procaine HCl.....	0.25%
Butyl-p-aminobenzoate (Butesin).....	5%
Polyethylene glycol-300.....	2%
Propylene glycol.....	78%
Water for injection.....	20%
Preserved with	
Sodium metabisulfite.....	0.1%
Phenyl mercuric borate.....	1:25,000
<i>Diothane Hydrochloride: 1% Solution</i>	
(pH 5.9; 14-16 days)	
Diperodon hydrochloride—1%	
Piperidinopropanediol diphenylurethane hydrochloride in aqueous solution.	

noted (Fig. 2) as compared with a normal skin section of the guinea pig (Fig. 1). No abnormalities are detected in Fig. 1. All the layers of the skin and subcutaneous tissue down to the muscle on the right are present; hair follicles (ovoid) are seen to the left. Fig. 2 is a skin section taken from a guinea pig 13 days after a subcutaneous injection of 2 c.c. of Duracaine. There were marked localized areas of fibroblastic proliferation and muscle degeneration with replacement by fibrous tissue.

Procaine base alone did not promote such drastic changes. There was no thickening clinically upon subcutaneous injection and only a



mild transient redness occurred upon intradermal injection. Fig. 3 illustrates the histological changes occurring 14 days after a subcutaneous injection of 2 c.c. of a 2% procaine base suspension in physiological saline. A very mild fibrotic reaction is noted with a few areas in which the muscle shows some mild degeneration; much less evidence of damage is seen than when some other agents are used. Upon intramuscular injection of this suspension, the muscles appeared essentially normal except for a small amount of œdema.

Apparently procaine base is not mainly responsible for the untoward reaction seen in Duracaine. As the suspending medium used in the preparation, aluminum hydroxide, might be

Duracaine as compared with 2 to 4 days when procaine base alone was used in animals.

Further evidence of damage to tissues produced by suspending agents was obtained by injecting aerosol O.T. into experimental animals. This agent is the suspending medium in a suspension of procaine base reported by S. Monash.<sup>2, 3</sup> He maintains that in experiments on himself anæsthesia lasted 4 to 14 days; no mention is made of any toxic or abnormal manifestations. The duration of anæsthesia following similar injections in guinea pigs was 8 to 10 days; invariably in guinea pigs, rats and rabbits changes in the injected areas were observed. Gross examination of the injected areas revealed that a local reaction occurred as seen by the

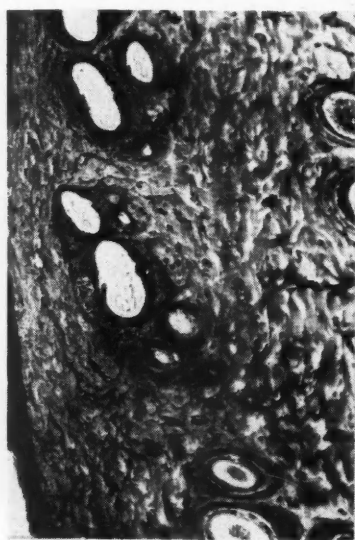


Fig. 1



Fig. 2

Fig. 1.—Control: 2 c.c. subcutaneous injection of normal saline. x 80. Fig. 2.—Duracaine. x 90.

contributory, a suspension of this material corresponding to that in Duracaine was injected subcutaneously into guinea pigs. The histological picture obtained showed a fibroblastic reaction similar to that with Duracaine together with necrotic areas in the fibroblastic masses. The gross examination of animals injected with Duracaine or aluminum hydroxide revealed similar reactions. These were the thickening of the skin upon subcutaneous injection and a reddening of the skin following intradermal injection. Similar changes were observed in the rabbit and rat. Merthiolate, used as a preservative, added to the undesirable reactions by causing a redness upon intradermal injection in guinea pigs and usually a marked inflammatory reaction when injected subcutaneously in a man. The duration of anæsthesia was 1 to 8 days for

development of a red area (subcutaneous) with a yellow centre (intradermal) which sloughed out. Similar effects were observed in the rabbit and rat. Upon histological examination extensive tissue damage was apparent. Fig. 4 represents a skin section removed from the back of a guinea pig 14 days after the subcutaneous injection of 1 c.c. of a 2% procaine base suspension in 0.1% aerosol O.T. It will be noted that the keratinized layer is gone and a semi-abscess formation is evident. A granulomatous reaction occurred with multinucleate giant cells and fibrosis. A 2 c.c. subcutaneous injection of this suspension was followed by fibrotic replacement of degenerated muscle within 13 days. Nine weeks later muscle destruction and fibrotic replacement are still in evidence. The intramuscular injection (0.5 c.c.) of this suspension was fol-

lowed by muscle destruction; Fig. 5 shows such destruction at a 15 day period; normal muscle is shown on the left whereas on the right can be seen fibrotic replacement with necrosis. After a 6 weeks' period fibrosis is still apparent in the muscle. Since procaine base alone produces relatively little effect on the tissues the greater amount of reaction noted appears to be due to the aerosol suspending agent.

An attempt was made to combine procaine hydrochloride with sodium salts of some dibasic acids. It was hoped that such a combination would have the property of liberating the procaine slowly and thus prolonging anæsthesia. One of the combinations obtained was that of procaine stearate. This was obtained by combining procaine hydrochloride with sodium

Efocaine (Table I) a commercial preparation has a prolonged anæsthetic duration of 9 to 22 days when injected subcutaneously during which time thickening of the injected area persists. Intradermal injection (Fig. 6) was followed by necrosis, ulceration and sloughing out of the area in 6 days. Fig. 7 shows a skin section removed from a guinea pig 17 days after a subcutaneous injection of 2 c.c. of Efocaine. Muscle degeneration is evident with fibrotic reaction, some giant cells and necrosis. A preparation of one of the components of Efocaine, butesin 5% suspended in 5% gelatin at pH 8.8 when injected subcutaneously maintained anæsthesia for a period of 4 days during which time thickening occurred; a very red area developed when the preparation was injected intradermally. The

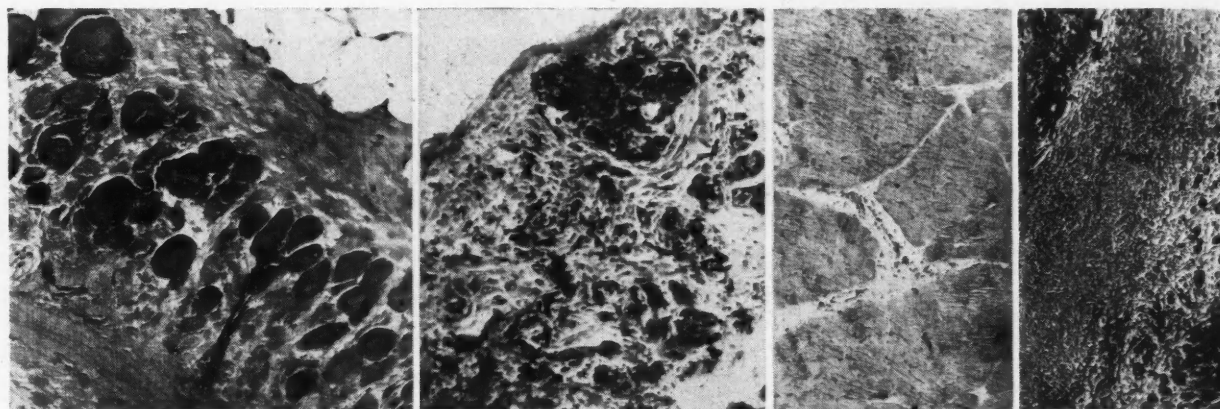


Fig. 3.—Procaine base suspension (2%) in saline.  $\times 90$ . Fig. 4.—Procaine base 2% plus aerosol O.T. 0.1%.  $\times 80$ . Fig. 5.—Normal quadriceps muscle. Procaine base 2% plus aerosol O.T. 0.1%.  $\times 50$ .

stearate on a mole/mole basis. This compound, which readily suspends itself in saline (pH 7.5 to 8.52), produced a local anæsthetic effect lasting 2 to 6 days when a 2% suspension was injected subcutaneously. Some local reaction was indicated by a slight redness in the injected area as well as some thickening of the skin. Sodium stearate (pH 8.9) alone upon intradermal injection caused a transient slight redness. The histological picture obtained with procaine stearate resembled that of Duracaine except that the reaction was more severe. Masses of fibroblastic proliferation were seen much as with Duracaine. Small necrotic areas appear in regions of fibrosis. Degeneration and fibrous replacement of some muscle tissue takes place. An abscess formation was indicated by the presence of leucocytes. There was also some fatty infiltration.

strength of the dose given could not be properly assessed (probably less than 200 mg./kg. (5%)) since it was difficult to force the particles through the syringe; it is therefore necessary to solubilize butesin as it is done in Efocaine with the use of glycols. However, 78% propylene glycol, as used in Efocaine, injected subcutaneously caused reddening; intradermal injection gave rise to a yellow ulcerated area. A subcutaneous injection of 2 c.c. of 78% propylene glycol in physiological saline gave rise to an insensitive thickened area which persisted for 15 days when skin sections were removed for histological examination. The changes resembled those seen with Efocaine (Fig. 7). There was a definite giant cell formation and muscle replacement with fibrous tissue. Since the 78% propylene glycol alone produces anæsthesia and tissue damage similar to that produced by Efo-



caine it appears that this solvent may be the substance responsible for the prolonged action obtained with this preparation.

Proctocaine (Table I) another commercial preparation maintained anæsthesia for 8 days. The gross appearance of an animal, 5 days after the subcutaneous and intradermal injection of proctocaine was similar to that seen when Efo-caine was used (Fig. 6). The area injected subcutaneously became thickened; ulceration occurred in the intradermal area which sloughed out the next day. Butesin injected alone causes a local reaction as noted above. Upon subcutane-

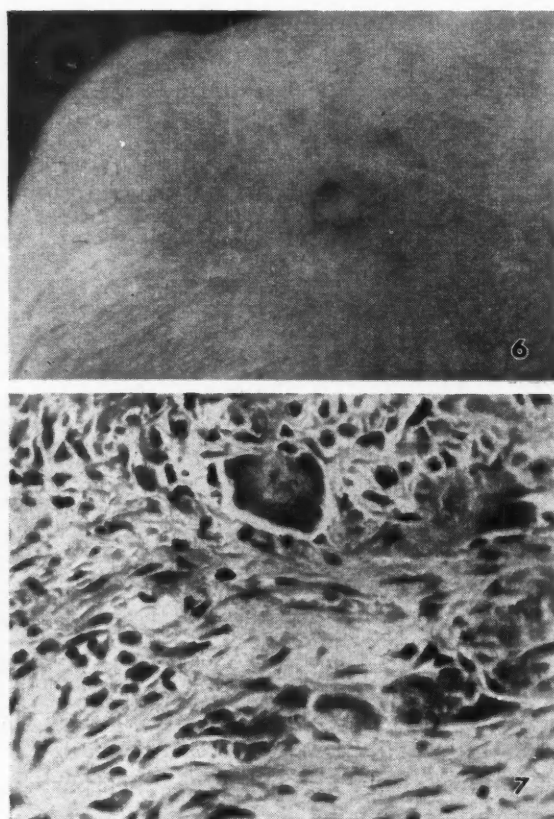


Fig. 6.—Efo-caine: 5 days following a subcutaneous injection of 2 c.c. (outer dotted area) and an intradermal injection of 0.1 c.c. (central ulcerated area).  
Fig. 7.—Efo-caine,  $\times 300$ .

ous injection of 5% benzyl alcohol in physiological saline some redness of the area occurred which disappeared the following day. Parts of this area were insensitive to a light touch of a pin point after 7 days. An intradermal injection gave rise to a yellow necrosed area.

Diothane HCl (Table I), a local anæsthetic usually employed topically, upon subcutaneous injection caused thickening, the disappearance of which corresponds with the return of sensation. The area injected intradermally (similar to Fig. 6) ulcerated in 5 days and sloughed in

6 days. It was noted that areas appeared to be hypersensitive at the time reddening was observed prior to the thickening. Skin sections were removed 11 days after a subcutaneous injection of 2 c.c. of 1% Diothane HCl solution. In Fig. 8 the fibrotic reaction has occurred in the fatty subcutaneous tissue.

Animal experimentation was supplemented by experiments on human volunteers from among the staff of Shouldice Surgery who received 2 to 5 c.c. of 2% procaine base suspension in 4% Knox special gelatin solution subcutaneously in the forearm. The boundary of each injected area was marked with ink and tests for sensitivity were made by means of pin pricks. The injected area immediately became numb with a sensation of coolness; testing by pin pricks showed complete anæsthesia. A definite numbing sensa-

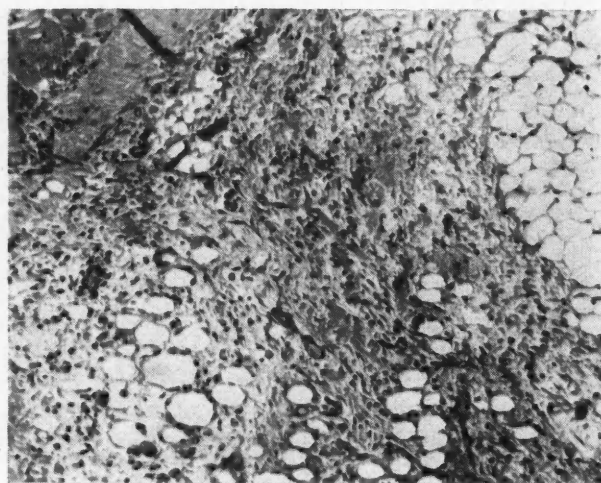


Fig. 8.—Diothane HCl.  $\times 80$ .

tion persisted for 8 hours. At 24 hours some parts of the injected area were insensitive to pin pricks but on the whole most of the local anæsthesia had disappeared. In two cases some mild deep tenderness was reported which disappeared the following day. However, no untoward reactions such as thickening or redness of the injected area were noted upon gross examination. Similar effects occurred when a 2% suspension of procaine base in saline was tested in these subjects.

#### DISCUSSION

At the commencement of this work it was postulated that insoluble compounds of anæsthetic agents could be utilized to bring about the slow release of the anæsthetic agent in the tissues with a resultant prolonged anæsthetic



effect in the area. Several compounds of this type have been investigated notably procaine base and some of its salts. Several commercial preparations which purport to act on this principle have been investigated.

It has been suggested by others<sup>2, 3</sup> that procaine base itself would give rise to a long-lasting local anæsthesia but our results indicate that while there is some prolongation of the anæsthetic effect it is only a matter of hours rather than days for which we had hoped. In the human forearm there was anæsthesia for about 8 hours with possibly some dulling of sensation for 24 hours while in the backs of guinea pigs the effect lasted from 2 to 4 days. A more rapid blood flow in the human arm as compared with the guinea pig's back may account for this observed difference in anæsthetic duration. Our work thus confirms and extends that of Duncan and Jarvis<sup>4</sup> who tested oil preparations of procaine base in cats. These authors concluded that the long-lasting anæsthesia produced by the compounds they tested was actually due to degenerative effects produced in the smaller nerve fibres (under 1 mm.) by the benzyl alcohol in the test preparation rather than to the procaine base. Clinically, approximately two weeks was required for recovery from these degenerative effects; histologically, degeneration could be demonstrated for a much greater period than this time.

The commercial preparations tested all gave long-lasting anæsthesia of varying duration but their clinical use must be viewed with some apprehension. Each one gives rise to undesirable tissue reactions which our tests indicate are due to their constituents other than the procaine base which itself produced only a small amount of reaction. The anæsthetic substances used in these preparations seem to be responsible for the immediate onset of anæsthesia; the degree of tissue destruction appears to parallel the prolonged action of the commercial products tested. This indicates that if these compounds are used their limitations should be clearly recognized. The reaction about the area of injection would undoubtedly increase the possibility of infection occurring in that region and is of such magnitude that injections into critical areas such as near joints should be avoided. Pooling of the drugs would enhance these deleterious effects.

Investigations are proceeding to secure suspending agents for insoluble compounds which

are less toxic than those tested, *e.g.* aerosol O.T. and aluminum hydroxide, and to determine how much of the long-lasting anæsthetic effects studied are due to nerve degeneration.

#### CONCLUSIONS

1. The significant amount of gross and histological reaction produced upon subcutaneous and intradermal injection in animals of four commonly advertised commercial long-lasting local anæsthetics would indicate that these compounds are far from ideal and that they should be used only with great care.

2. Procaine base is not responsible for the long-lasting anæsthetic effects of the compounds containing it but does give rise to the immediate anæsthesia which occurs.

3. Procaine base is not responsible to any great degree for the reactions occurring in the tissues with these anæsthetic agents. The suspending agents used such as aerosol O.T. and aluminum hydroxide, on the other hand themselves produced considerable tissue reaction.

4. The prolonged action obtained with the commercial preparations studied appears to be associated with the tissue damage brought about by the various materials, other than the anæsthetic substances, used in these products.

We would like to express our appreciation and thanks to all those who have assisted in any way with this work and would particularly like to acknowledge our indebtedness to Dr. J. K. W. Ferguson and Dr. G. H. W. Lucas of the Pharmacology Department for their advice and facilities made available for this work (Photographs of guinea pigs taken by Dr. G. H. W. Lucas); to Dr. E. E. Shouldice for his financial support of this project as well as assisting in the clinical research part of the problem; to Dr. S. Hartroft of the Department of Banting and Best Medical Research for the pathological studies contributed (Microphotographs of slides taken by Dr. S. Hartroft); to Dr. G. F. Wright of the Chemistry Department for the generous supply of dibasic acids. We are indebted to the pharmaceutical firms mentioned below for Duracaine (Harvey Laboratories), Efocaine (Fougera), Knox special gelatin solution (Knox Gelatine Protein Products Inc.), and Diothane HCl (Merrell).

#### REFERENCES

1. SHOULDICE, E. E.: *Ont. M. Rev.*, 2: 43, 1945.
2. MONASH, S.: *New York State J. Med.*, 50: 1229, 1950.
3. MONASH, S. AND GUIDUCCI, A.: *New York State J. Med.*, 50: 1929, 1950.
4. DUNCAN, D. AND JARVIS, W. H.: *Anæsthesiology*, 4: 465, 1943.

ACTH and cortisone cause uncertain and unpredictable remissions in acquired hæmolytic anæmia and thrombocytopenic purpura. These drugs cause temporary improvement in a few cases of leukæmia and have no effect on aplastic and refractory anæmias.—Med. Research Council: *Brit. M. J.*, 1: 1261, 1952.

TUMOUR CELLS IN THE  
BONE MARROW SMEAR\*H. E. AMY, B.A.<sup>†</sup> and  
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*[It is our feeling that physicians generally have not been made aware of the tremendous information which can be obtained from examination of a bone marrow smear. We have too long thought of the marrow in terms of typing anæmia and classifying leukæmia—but primary tumours (for example, myeloma), secondary tumours, lupus erythematosus, tuberculosis, other infections, and even rheumatoid arthritis, present often a typical and diagnostic picture. It is recognized that most physicians will not be interested in the detailed technology described below, nor will many wish to labour over the microscopy; however, the great number of malignancies which we have been able to diagnose by this method when all else was negative, leads us to presume that all physicians should strive to have their own hospital technologists learn to study the marrow for extraneous cytology.]*

ANÆMIA or abnormal white blood cell counts, or a high sedimentation rate, in patients defying diagnosis by other means lead us to do more exhaustive studies of the bone marrow aspirate.

Some six years ago we noted tender areas of the sternum in some such undiagnosed patients and did a marrow aspirate at these spots. We observed extraneous cells in these smears and speculated that they might be metastases. Subsequently, we did marrow punctures more often and pressed for post mortem, biopsy or radiographic confirmation of our tentative diagnosis of metastatic tumour. The pattern developed, our statistics, and, we think, the confirmation of our diagnoses, follow in the substance of this paper.

It was not until at least fifty positive aspirates were obtained that it was realized that very many patients with carcinoma were being diagnosed first in our hæmatologic laboratory by marrow studies, and subsequently we even felt able in major degree to correlate the morphology of the cell type found in the aspirate with the primary site of the tumour growth.

## PROCEDURE TECHNIQUE

The preparation of the slides and aspirate for examination is relatively simple. The aspirate obtained by the operator is kept to a minimal amount (about two to three drops) and ejected on to a clean slide. Within seconds the slide is tilted and the superfluous bloody aspirate is removed, leaving the heavier marrow material along with the larger particles which are usually

seen in positive cases. The spreader slide is used to pick up a small drop of the aspirate, together with at least one of these particles. The material is then carefully spread over the specimen slide, making sure that the particle remaining at the distal end is carefully smoothed out. This method assures a preparation which can be examined in more detail as to its cytological and histological structure than an actual fixed section of bone marrow, as performed in pathology on biopsy specimens. Leishmann's is the stain of choice and has been used throughout by us. It is preferable that the stain be adequately matured and used with a phosphate buffer.

Evidence is sufficient from our work to establish the fact that puncture at the site where bone changes may occur increases the percentage of positive findings, and often the physician will find a tender area in rib, iliac crest, spine, or more often, sternum in many of these patients.

From June, 1949 to June, 1952, 1,100 marrow punctures were performed, 335 of these being specifically examined for malignant cells. Of these 265, or 65%, yielded positive findings, the majority of which were confirmed by surgery, radiography, biopsy or post mortem examinations. 164 of the 265 patients had presented a complete diagnostic problem, with no clue as to etiology prior to marrow puncture.

Those cells which we have designated as malignant proliferate through the marrow medulla and are not and cannot be identified as hæmopoietic cells. It is true that they can give rise to a reaction of the hæmopoietic cytology in that they very often produce a leucoerythroblastic response. It is also true that they may often act as a stimulus to a plasma cell increase. We have found an increase of plasma cells from 2 to 13% of the total nucleated cell differential in many. Further stimulation or irritation is evident in the rise of eosinophils, which are not increased in the peripheral blood of these patients and so may be considered as a local response within the marrow to foreign protein metabolites.

The tumour cell types may be easily identified by their tendency to form a syncytium or group within the hæmopoietic substance. The cells are fairly consistent in their general morphology but vary in size and behaviour, depending upon the organ in which the primary tumour is situated. These cells show one or two nucleoli, large in proportion to the nucleus, and the nucleus predominates in size as compared with the cytoplasm. The chromatin structure shows a loosely knit, coarse net of chromatin threads set against a colourless ground matrix. The cytoplasm is quite fragile, often shows a slight to deep baso-

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philic reaction and, at times, contains vacuoles.

Although the hyaloplasm is often colourless, the spongioplasm may show a coarse, unevenly distributed granulation, acidophilic in its reaction and appearing more like a precipitation than a functional organization of the cytoplasm. This latter finding is particularly true in the cells from bronchogenic carcinoma.

#### CELL TYPE AND POSSIBLE RELATION TO SITE OF PRIMARY TUMOUR

Variation in the size of tumour cells may be an important factor in deciding the site of the primary tumour. Rib aspirates have yielded a small type of metastatic cell in many cases of bronchogenic carcinoma. Eosinophilic staining areas have been noted throughout the syncytium. There is also a marked tendency of this cell to be found singly, which may suggest it is more easily separated from the original mass. When the large type of cell is seen it is more apt to be found in masses of 50 to 75 cells and shows a greater tendency to an adherent type of cytoplasmic material. This probably accounts for the fact that it is rather unusual to find entire single cells throughout the marrow but rather degenerate nuclei when not in the masses. This cell type, we have noted, seems to occur in metastases from the gastro-intestinal tract. However, the cells which are present in cases of carcinoma of the colonic areas, show permeation of mucoid-like, acidophilic staining material at the periphery of the cell groups. An intense basophilic staining of the cytoplasm of these cells also has been observed.

The large type cell also is found in cases of adenoma of the prostate and ovarian tumours. In these, the syncytium seems to be usually enmeshed in fibrous-like masses infiltrated by plasma cells and, in ovarian tumours, by eosinophils. There has also been noted an increase in the fibrinogen content of the marrow in these cases.

In a previous article,<sup>1</sup> the malignant process of dissociation of cytoplasm-nucleus function and structural alteration was discussed. It is evident in almost all pathological processes involving extraneous invaders, hæmopoietic or non-hæmopoietic, that rapid mitosis produces nucleus alteration either as a causative or resultant factor. In lymphosarcoma, the lymphoid invaders show retention of the characteristics of the lymphoblast cytoplasm but the nuclear

chromatin shows quite prominently the presence of accentuated karyosome structures or false nucleoli in the chromatin mass. Karyosome structure or nucleinic nucleoli show considerably more accentuation and an affinity for basic stains, while nucleoli, which they structurally resemble, are generally acidophilic. This structural alteration is due no doubt to the fact that embryonic<sup>2</sup> and carcinogenic tissues synthesize much greater quantities of nucleic acid than do normal cells, resulting in an altered chromatin aggregation.

#### THE RETICULUM CELL

The reticulum cells and their derivatives in marrow have been given very little attention, due to their scarcity and the failure of the inexperienced cytologist to recognize them as cell entities in sternal marrow. The cytoplasm of the primitive reticulum cell is non-granular and susceptible to damage by smearing, while the nucleus is large and round (7 to 8 $\mu$ ) with a spongy, inter-spaced chromatin appearance. The cytoplasm may be quite abundant. A malignant variant of the cytoplasm and functional behaviour of this cell has been observed in two cases of agranulocytic angina, where the cell variant showed marked phagocytic activity with the presence of ingested hæmopoietic cells within the cytoplasmic matrix. The large reticulum cell, showing alteration in functional and metabolic activity, chiefly of the cytoplasm, is evident in Gaucher's disease, Niemann-Pick's disease and Hand-Christian-Schüller disease. It is evident in these diseases that abnormalities of the mitotic processes exist and the cytoplasm assumes a storage, and possibly a production, function which is not consistent with normal cytoplasmic activity. Abnormal protein or lipid metabolism results in storage of kersin, phospholipids or lipid variants within the cytoplasmic mass.

#### THE PLASMA CELL

The plasma cells show deviation from normal cytology, particularly in cases of multiple myeloma. We have previously mentioned in this article the presence of plasma cells above the normal count in cases where the marrow has been invaded by extraneous cells. In multiple myeloma, the functional dissociation factor is still evident as the cells appear moderately large (15 to 30 $\mu$ ) and contain a nucleus about



5 to 7 micra in diameter. The cytoplasm is basophilic and stains bright blue, indicating change in the protein composition as a deviation from the normal blue-green complex usually found in normal plasma cells. By staining methods it has been shown that in normal plasma cells the albuminous content is maximal, while in myeloma cells the cytoplasm stores globulin fractions in its inclusion bodies. The nucleus of the myeloma cell follows the rule of malignant cytology in that the nucleus may continue to divide in isolated fashion totally divorced from that of the cytoplasm. Thus we find many binucleated and tri-nucleated forms of this cell.

Serial marrow aspirations were performed on seven cases of diffuse myeloma treated with radioactive phosphorus. The aspirations were done before treatment, then one week, two weeks, and four months after treatment. Before treatment, a typical picture of multiple myeloma was evident in the marrow aspirate, and confirmed by clinical findings. One week after seven millicuries of  $P^{32}$  were given, the aspirate showed a reduction of the myeloma cell count by two-thirds. The hæmopoietic elements appeared toxic with a general reduction in all maturation stages. However, a further reduction in the myeloma cell count was evident in two weeks with a much higher regenerative index in the normal leucopoietic cells. Four months later, when x-rays often showed increased bony calcification, the myeloma cell count was not appreciably elevated and the regenerative leucopoietic index was much higher than at the two week level.

In comparison, we noted that after urethane treatment in several other cases, though the myeloma cell count was decreased appreciably, the toxic effect on the leucopoietic cells was cumulative, with a resultant degenerative curve in the normal hæmopoietic cytology.

In the course of our study we observed two myeloma patients who did not respond clinically in a satisfactory manner. Four weeks after treatment with  $P^{32}$ , in spite of the reduction in the myeloma cell count, masses of mitotic reticulum cells were present within the marrow aspirate. These cells assumed all the characteristics of a malignant invader rather than a hæmopoietic function, and for this we have at present no satisfactory explanation.

A discussion of plasma cell variants would not be complete without mentioning the plasma

cell type often found by us associated with Hodgkin's disease. The cell noted here is characterized by a proliferated, very basophilic cytoplasm and a deeply staining chromatin material in the nucleus. Nucleoli are often evident in the nucleus of these cells. On finding the cell type several Hodgkin's have been led to diagnosis (a significant finding, we think).

#### SUMMARY

A basic study of pathologic alternations in marrow cytology has been presented. More intensive studies are being made which, we feel, are worthy of publication upon longer term observation of a greater number of cases.

It is our contention that basic alterations in metabolic and functional activity of either cytoplasm and nucleus, or cytoplasm and not nucleus, or nucleus and not cytoplasm, are evident in all cases in our series. Further histochemical studies on the abnormal mitotic or functional trends of these cells are necessary but we feel an hypothesis has been established for identification of extraneous cell invaders of hæmopoietic marrow.

Clinically, we feel it can not be stressed too strongly how often will a careful examination of a good marrow aspirate by an expert hæmatologist give the physician a diagnosis or a strong lead, in many patients presenting difficult diagnostic problems.

#### REFERENCES

1. AMY, H. E.: *Canad. J. Med. Technology*, 13: No. 2, 1951.
2. EVERETT, M. R.: *Medical Biochemistry*, Harper & Brothers, New York, 1942 Edition.
3. JOHNSON, U. AND RUNDLES, R. W.: *J. Hæmatology*, 6: 16, 1951.

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Upper abdominal pain and jaundice are important early symptoms of pancreatic malignancy. The appearance of obstructive jaundice with or without gallbladder distension calls for immediate diagnostic investigation which, in addition to the routine studies, should include (1) cytologic study of duodenal drainage, (2) determination of the serum lipase level, (3) stool examination for evidence of pancreatic insufficiency, and (4) the secretin test. If full use is made of the available diagnostic procedures, it is anticipated that the poor prognosis usually associated with carcinoma of the pancreas will be improved.—J. C. Country and R. Foulk: *U.S. Armed Forces Med. J.*, 4: 831, 1953.

## Case Reports

### INFECTED VAGINAL CYST\*

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CYSTS OF THE VAGINAL WALL are sufficiently rare to arouse interest. The case here reported is unusually interesting because of the wanderings of the patient from doctor to doctor in an endeavour to obtain relief from her symptoms, and because the origin of the cyst remains obscure.

Mrs. R.K., aged 26 years, Para 2, Gravida 2. Following delivery of her first child in 1944, patient complained of a feeling of "something" in the right wall of the vagina which caused pain during intercourse. She was otherwise well until the birth of her second child in March, 1952, in a rural hospital. After this delivery the vulva and episiotomy scar were very painful and she had a constant sensation of "pulling down" in her pelvis. She was told there was nothing to worry about and was discharged from hospital. A week later, two or three cupfuls of foul greenish pus "with fish scales in it" were passed *per vaginam*; for three days prior to this discharge the right buttock had been greatly swollen. The condition was diagnosed as a stitch abscess. Two weeks later the buttock was again swollen and the patient consulted a doctor in another town because she was unable to sit due to the pain. She was given penicillin injections for three days. A week after these injections and four weeks after delivery the patient was admitted to hospital in a third town; an incision was made through the vagina and two to three cupfuls of foul pus were again evacuated. Incision and drainage were repeated in three days and the patient remained in hospital for two weeks. She continued to have a dull aching pain in the right side of the pelvis and severe dyspareunia. Every second day she returned to the third doctor who maintained drainage by inserting a finger into the cavity through the vagina.

In July, 1952, four months after delivery, a cystic swelling appeared through the episiotomy scar and the patient consulted a fourth doctor in another town. Hot compresses, penicillin and aureomycin were prescribed and later the abscess

was opened once *per vaginam*. This fourth doctor told her that the abscess had drained into the rectum but the patient has no recollection of this happening; on bowel movements she noticed some yellow-green pus being passed, but thinks that it came from the vagina. She gives no clear history of a recto-vaginal fistula.

In September, 1952, the patient came to Winnipeg and consulted her fifth doctor. In December she was admitted to a hospital and the abscess was incised through the vagina, "the lining scraped", a drain inserted and hot foment, penicillin and aureomycin administered. Constant drainage of foul green pus persisted and in February, 1953, she was referred to the Outdoor Gynaecology Clinic of the Winnipeg General Hospital. She was admitted to the public ward on February 27, almost twelve months after the beginning of her symptoms.

Vaginal examination after admission revealed a soft, fluctuant swelling which began 1" above the introitus on the right side and extended upwards throughout the length of the vagina; it was estimated to be about 1½" in sagittal diameter. Combined recto-vaginal palpation gave the impression that the swelling was beyond the limits of the vaginal wall, located in the ischio-rectal fossa. The pelvic organs were otherwise normal. Visual examination revealed no pus. The leucocyte count was 8,900 and the sedimentation rate was 12 mm. Consultation with the Department of Surgery was requested as to the structural origin of the abscess and management for a permanent cure. Patient was examined by Dr. C. W. Burns two days after the previous examination and pus was found in the vagina although the sinus was not located. Exploration under anaesthesia was advised. At this time the diagnosis rested between an infected cyst of Gaertner's duct, or an infected haematoma which had occurred with the first delivery in 1944 and had ruptured during the second delivery in 1952, with re-infection of the cavity.

Operation was done on March 9. A tiny point of granulation tissue was found about 1½" above the introitus on the right vaginal wall; no pus was evident. Persistent firm probing revealed a narrow channel ½" in length; eventually the probe broke through into a cavity and a trickle of pus escaped. The channel was spread with forceps and a copious flow of greyish-white pus occurred, smelling strongly of *B. coli*. Culture from the pus grew Gram-positive cocci and *B.*

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*subtilis*. As drainage of the abscess in this manner had proved ineffective as a cure on four previous occasions, more radical measures were decided upon. A Schuchardt incision was made, extending from the drainage point in the vagina to well out into the buttock, and a large smooth-walled cavity was opened into. Laterally the wall of the cavity could be freed readily from the adjacent tissue, so removal of the sac was undertaken. This proved to be difficult, as, on inserting a finger into the cavity, it was found to extend from the levator muscle above, around behind the rectum medially, and to within  $\frac{3}{4}$ " from the skin of the buttock inferiorly. It was densely adherent to the levator, the rectum and the wall of the vagina. Blunt dissection, mostly with the finger tips, was done because of the vulnerable position of the rectum. The sac was finally removed complete and appeared large enough to cover a billiard ball. The levator muscle was visible intact at the apex of the wound, and a sponge-stick in the rectum showed it to be intact also. Numerous blood vessels were ligated in the course of the dissection but a great deal of general oozing was present throughout the exposed ischio-rectal fossa. A few deep sutures were inserted to close the uppermost part of the fossa. The edges of the vaginal wall were approximated with interrupted sutures, and the triangular cavity was then packed with iodoform gauze. A few skin sutures were inserted leaving the wound open sufficiently to permit removal of the packing. The vagina was packed tightly to aid hæmostasis in the depth of the wound. Penicillin and streptomycin were ordered for eight days.

Twenty-four hours after operation the vaginal packing was removed, and the packing from the wound was eased out gradually over the next six days. The patient's temperature rose to  $101.3^{\circ}$  on the first and second postoperative days, but thereafter was normal. Examination before discharge on March 23, 1953, showed considerable residual thickening of the right vaginal wall; there was no further drainage and the wound had healed satisfactorily.

*Pathologist's report.*—Specimen consists of cystic mass measuring  $6 \times 4 \times 4$  cm. External surface is shaggy and hæmorrhagic. On section, cyst wall measures up to 0.5 cm. in thickness. Lining is irregular but shiny. *Microscopic.*—Wall is lined by stratified squamous epithelium, deep to which are few inflammatory cells. The wall is

composed of fibrous and muscular tissue and is fairly vascular.

*Summary.*—Infected cyst, originating from Gaertner's duct?

#### EMBRYOLOGY OF THE GENERATIVE ORGANS

In the early stages of the human embryo the urinary and genital organs are so closely associated that it is impossible to properly appreciate the development of either without an understanding of the growth of both. With an exception of the later stages, when there is a fusion of some of the structures in the midline, most of the organs develop bilaterally, with comparable changes occurring on each side.

*The pre-somite and early somite stages.*—The ectoderm, the endoderm and mesoderm comprise the germ layers of the flattened disc-like presomite embryo. The reproductive and excretory organs are for the most part developed from embryonic mesoderm which, at first, is a strand of loosely connected tissue lying between the other two layers and extending laterally from a centrally placed notochord.

The medial portion of the mesoderm becomes thicker and larger, and at about the 21st day of embryonic life begins to divide into symmetrical, bilaterally paired blocks of tissue (somites). The lateral portion (or plates) of the mesoderm remains unsegmented and eventually splits to form the lining of the coelomic cavity, while that part of the mesoderm between the somites and the lateral plates becomes the intermediate cell mass. The intermediate cell mass is often called the nephrogenic cord, because first the urinary and later the internal generative organs develop from it.

At the third week of embryonic life, in relation to each segment 2-3 tubules develop whose essential characteristic is secreting (an excretory organ). These tubules form as diverticulæ from the original coelomic cavity from the cervical to the sacral region. The series cephalad to the mid-thoracic segment is called the *pronephros*. The series caudate to the mid-thoracic segment is called the *mesonephros*.

The mesonephric duct (Wolffian duct) appears lateral to the genital ridge by the union of the distal ends of the pronephric tubules. Each tubule turns back and unites with the one behind so as to form a continuous cord of cells, which grows back as a solid cord to the cloaca, which it reaches in the human embryo at the 4-5 mm. stage (4th week). This is the height of its development. It acquires a lumen beginning at the anterior end and extending back to the cloaca.

The mesonephric tubules, about 30 in number in the human embryo, arise in the intermediate cell mass or nephrotome. One end of each developing tubule opens into the mesonephric (Wolffian) duct. The other end forms a Malpighian corpuscle, 12 of which, the genital tubules, in the human embryo lie in relation to the gonad and become connected with it by the rete cords.

The mesonephros forms a projecting mass in the lumbar region of the 20 mm. embryo, but at 16 weeks only a few rudiments remain. The mesonephros probably has some excretory function, for each tubule is invaginated by a capillary to form a glomerulus.

In the adult female some of these mesonephric tubules persist as paroöphoron—a few tubules lying in the broad ligament just below the tube and close to the uterus. From the Bowman's capsule of the Malpighian corpuscles cell buds grow out into the gonad, forming the rete cords which branch out and anastomose with each other, forming a network. In the female they part to join the primary sex cords and may or may not acquire a lumen.

In the female the primary sex cords and rete cords normally disappear, but some traces of each may remain and even acquire a lumen, forming a rete ovarii, the rudiments of an ova-testis.

From the distal end of the mesonephric (Wolffian) duct, close to its opening into the cloaca, a diverticulum



appears during the 5th week (5 mm.) of embryonic life and is the forerunner of the ureter. As it elongates to form the permanent duct, the renal pelvis, and the collecting tubules, it is capped by the nephrogenic tissue of the metanephros which forms the secreting portion of the kidney. This developing structure lies dorsal to the mesonephros and makes its way from the hollow of the sacrum to the 3rd lumbar region (14 mm. size). With the separation of the ureter from the mesonephric (Wolffian) duct in the 7th week (20 mm.) it comes to open separately in the urogenital sinus.

During the initial stages of the metanephros the pelvic ends of the mesonephros fuse to form a genital cord in which lie the mesonephric (Wolffian) ducts and more mesially the Müllerian (paramesonephric) ducts. The mesonephric (Wolffian) ducts play no part in the formation of hymen or vagina. They begin to involute when the embryo reaches the 50 mm. length, and usually disappear from the genital cord altogether.

In adult females the mesonephric (Wolffian) duct forms the duct of Gaertner which runs as an ill-defined cord in the mesosalpinx, parallel to the uterine tube, and usually ends at the site of the uterus. Sometimes it persists further, reaches the side of the cervix, gradually approaches the vaginal mucosa, under which it passes to terminate by a small opening at or near the base of the free margin of the hymen. Occasionally it may form at the side of the vagina or in front of it, a Gaertner duct cyst.

#### DISCUSSION

The previous paragraphs give a brief résumé of the embryology of the female genital tract. In light of this knowledge the present lesion may be assessed. It is a cyst in the right ischio-rectal fossa attached to the lateral wall of the vagina just above the level of the hymen. The cyst has a wall of stratified squamous epithelium 0.5 cm. thick; it is infected but contains some squamous debris. There are the following possibilities.

I. *Gaertner duct cyst*.—(1) Geographically this could be a Gaertner duct cyst, as it arose in or was attached to the lateral wall of the vagina, above the hymen. This is along the embryological course of the obliterated mesonephric (Wolffian) duct. Because of its size and repeated infections, and stimulation by pregnancy, it had expanded into the ischio-rectal fossa. (2) Histologically the Gaertner duct cysts are usually lined with low cuboidal epithelium, but according to Novak it is possible to have a cyst lined with stratified squamous epithelium.

II. *Inclusion dermoid*.—(1) These are a more usual lesion of the vagina, in most series of cases. (2) The stratified squamous epithelium of the wall of the cyst and squamous debris fit in with an inclusion dermoid. (3) Its association with the vaginal wall and occurring following pregnancy, with possible vaginal trauma, would fit in with a diagnosis of inclusion dermoid. (4) The cyst however seems larger and more well defined than an occlusion dermoid, and although attached to

vagina it has no wide nor intimate attachment to it.

III. *Dermoid of the ischio-rectal fossa*.—(1) It is possible to have a dermoid arise at this site, even though it is off the midline. (2) The tissue of this case fits into the histological group of dermoids.

IV. It may be a reduplication or a branching off of the original vaginal plate. This has not been reported in the literature, but the inside of the cyst gives the gross appearance of such a lesion.

#### CONCLUSION

It is impossible to absolutely classify this vaginal cyst.

A review of the embryology concerned is given and a detailed report of the case history.

#### MASSIVE RESECTION OF THE SMALL INTESTINE\*

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HUMAN AND ANIMAL subjects can recover from massive resection of the small intestine. This case is of interest because of the long period of survival following an extensive resection of the small intestine. The patient lived for 316 days after removal of all the intestine from the 3rd portion of the duodenum to the mid-portion of the transverse colon.

A 46 year old veteran of the R.C.N.V.R. was admitted to the Queen Mary Veterans' Hospital, on June 10, 1951. He had worked as a policeman for many years prior to enlistment as a leading seaman. In 1946, at the time of his discharge from the Navy, a diagnosis of mitral stenosis and aortic insufficiency was made. There was no history of arthritis. On the day of admission, there was a sudden onset of dyspnoea, palpitations and pain in the lower part of the chest and epigastrium. On admission, he was fibrillating with a pulse rate of 90. He was digitalized, and improved for three days, after which time he felt a transient numbness on the left side of the tongue and face, followed by severe abdominal pain and a desire to defæcate. Embolus of the superior mesenteric artery was diagnosed and a laparotomy was performed by Dr. Campbell Gardner. All of the intestine was gangrenous from the third part of the duodenum to the mid-portion of the transverse colon. The gangrenous bowel was removed after it was verified that the

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superior mesenteric artery was totally obstructed at its origin from the aorta and could not be cleared. The third part of the duodenum and the transverse colon were exteriorized and subsequently anastomosed 43 days later.

The patient survived for slightly more than ten months. Except for short spells in a chair each morning he was bedridden during this period. Before his illness he had been demanding, exacting and sometimes moody, and following the operation these personality traits became more marked. He frequently refused veni-punctures and, whilst at first he agreed to balance studies, later they had to be discontinued because of lack of co-operation. The B.P. for the first two months was 110/60, but dropped to 90/55 in March and then hovered around 80/40. The pulse was 60 to 80 beats per minute depending on the dose of digitalis. On several occasions he had ankle oedema which decreased when he cut down on the salt intake. In December he developed atelectasis of both lower lobes. This gradually cleared up in the course of two weeks.

Throughout most of his hospitalization he complained of anal and rectal pain. A hæmorrhoidectomy was performed on two occasions, once on September 22 and again on April 18. There was transient relief on both occasions. Repeated examinations by a neurologist (Dr.

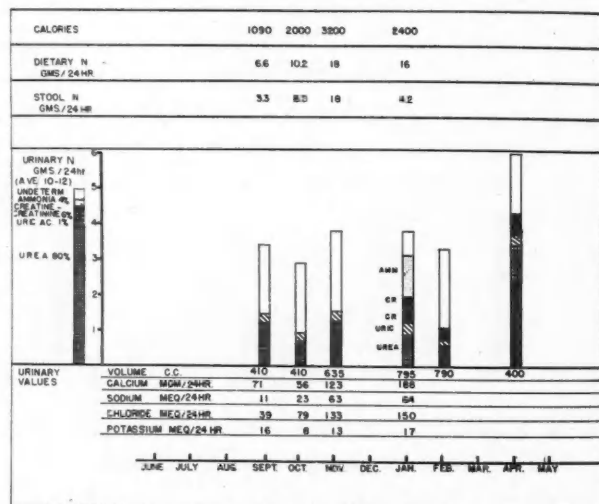


Fig. 1.—A daily average was calculated on the basis of three consecutive days for each month. Illustrated in the left margin are the approximately normal proportions of the total non-protein nitrogen when the NPN is 5 gram.

Miller Fisher) revealed no neurological changes. Before admission to hospital the patient weighed 175 lb., by the middle of August he weighed 105 lb. and there was little change after this. The fluid intake ranged from two to three litres per day. The urine output was around 500 c.c. daily. Usually he had about three to four liquid bowel movements each day with a volume of between 1,500 to 2,000 c.c. From February until the patient's death, the fluid intake was not calculated because he was unreliable in his handling of fluids, but the intake was less than during the previous month. Urinalysis revealed a specific gravity ranging from 1.010 to 1.015, the reaction being usually slightly alkaline. Occasionally there was some albumin. The microscopic examination was negative.

**Metabolic studies (Fig. 1).**—During the period of dietary calculation (September to November inclusive and for a few days in January) the caloric intake ranged from 2,000 to 3,500 calories per day. An average daily intake in November consisted of 3,000 to 3,500 calories, 300 to 350 gm. of carbohydrate, 140 to 200 gm. of fat, 150 gm. (20 to 25 gm. of nitrogen) of protein, 0.5 to 1.3 gm. of calcium. From November to March he ate and drank less and in the last two months the diet rarely contained more than 1,000 calories. A rough and ad-

mittedly not very accurate nitrogen balance was computed on various days in the period from September 1 to November 1. Generally the balance remained in equilibrium during this period on an intake varying from 6.6 to 18 gm. of nitrogen. The ratio of faecal nitrogen to urine nitrogen was approximately 3:4 during August, but then changed to a ratio of 3:1 in October. Normally this ratio is 1:10. The fractionated urinary nitrogen was interesting. The total volume of urine nitrogen was understandably low in view of the diminished urine output per day, but the urea fraction represented less than 50% of the total non-protein nitrogen (normal 80%). The remainder consisted of a slightly increased uric acid, a relatively normal amount of creatinine, pathological amounts of creatine and an excessive amount of ammonia and undetermined nitrogen.

Only one complete analysis was made. The patient was on a diet containing 180 gm. of fat. Volume of faeces was 820 c.c.—solids were 11.2%, total fat 43.6 gm. % dry weight, combined fatty acids 25.2 gm. % and neutral fats 20.4 gm. %. This indicates a defective absorption, but lack of accurate balance data prevents any determination of the percentage of ingested fat that was absorbed.

With the exception of chloride, the serum electrolytes were determined monthly. The serum sodium was low in September (136 mEq/L), but on subsequent occasions it was normal. The serum chloride was normal in August and September. The serum calcium remained below normal from October until April (4.0 mEq/L). The serum potassium was essentially within normal limits except for a value of 3.74 mEq/L in February. The urinary excretion of electrolytes is illustrated in Fig. 1. The serum protein value became progressively lower due to a decrease in both the albumin and globulin fractions. In April the total protein was 4.78 gm. % and the albumin 3.08 gm. %. The BMR on January 14 was -33%. The serum cholesterol was 100 mgm. % on December 28.

In January, the 17-ketosteroids were 1.3 mgm. and the creatinine was 0.5 mgm. The F.S.H. was negative at 6½, 13 and 26 mouse units/24 hrs. and the biological corticoids were 31 glycogen units for 24 hours.

**Peripheral blood picture.**—A hypochromic anaemia appeared within a month of the first operation and gradually became more severe. In April the RBC count was 3,300,000 per c.mm.; the haematocrit was 35% and the Hgb. was 68%. The WBC remained normal throughout the period except for the initial leucocytosis associated with the gangrenous bowel. A sternal marrow puncture performed in December was in keeping with the change expected in such an anaemia.

**Therapy.**—The patient was allowed to choose his own diet, but was discouraged from selecting foods with a high residue. About two weeks before his death he was given supplementary feedings of oral protein concentrates and finely emulsified fat.\* This combination provides a large caloric intake in a concentrated and reasonably palatable form. He was started on small doses which were gradually increased until he was receiving four glasses of this preparation a day (1,140 calories).

He received one Multivite pill t.i.d., but in February cheilosis developed and the lesions did not improve even though the Multivite dose was increased to 2 tablets three times daily. 200 mgm. of vitamin C was given orally each day. The heart rate was controlled by oral digitalis 1 or 1½ grains per day. It was calculated that he was receiving 12 mgm. of iron daily in the diet when he developed a hypochromic anaemia. He was unable to tolerate ferrous gluconate or ferrous sulphate and could not receive intravenous iron preparations. Amphojel was given to see if this might render the stomach contents less acid and perhaps ameliorate the proctitis, however, this was discontinued after two months. Banthine, 50 mgm. every six hours, was given to try to slow peristalsis, but it had to be discontinued

\*We are indebted to the Upjohn Company of Kalamazoo, Michigan, for generously providing the somagen and lipomul-oral used in this study, and to Dr. Earl L. Burbridge for the suggested schedule.



on the second day because of urinary retention. He received testosterone propionate 50 mgm. daily intramuscularly from September 14 to October 25 with the hope of producing an anabolic effect, but this did not occur, presumably because not enough nitrogen was absorbed.

**Necropsy (Fig. 2).**—Apart from extreme cachexia there was no obvious cause for the patient's death. The heart weighed 290 gm. and the presence of mitral stenosis and aortic insufficiency was confirmed. The lungs showed congestion in the right lower lobe and an infarct in the left lower lobe. The liver weighed 1,010 gm. and on section there was atrophy of the lobules but no fatty infiltration. The spleen, weighing 80 gm., showed small Malpighian corpuscles and disappearance of the germinal centres. The left kidney weighed 150 gm. and on section was normal. The right kidney weighed 80 gm. Microscopically it was hypoplastic and several old healed infarcts were present. The brain weighed 1,400 gm., but no gross or microscopic abnormalities were present. The bone marrow showed a diffuse hypoplasia

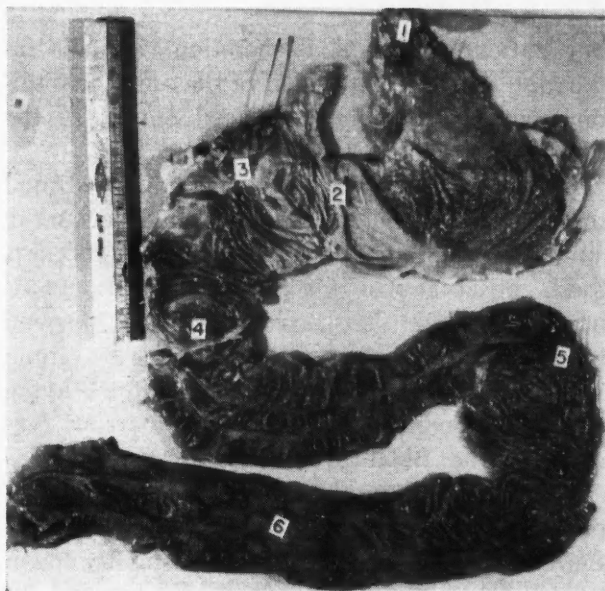


Fig. 2.—Gastro-intestinal tract laid open: (1) Cardia. (2) Pylorus. (3) Ampulla of Vater. (4) Site of anastomosis. (5) Splenic flexure of colon. (6) Sigmoid colon.

with normal cellular elements. When the abdomen was opened the stomach, duodenum and colon were enormously dilated, the duodenum measuring 8 to 10" in length. The microscopic examination was not very fruitful, possibly because the autopsy was done 16 hours after the patient's death. In the fundus of the stomach there was atrophy of gastric glands and marked reduction of the parietal cells. The duodenum showed no hyperplasia.

#### COMMENT

There is a considerable difference between the length of the small intestine before and after death. Alvarez<sup>1</sup> states that in adults the ante-mortem measurement is 8 to 10 feet, whilst post-mortem the average length is stated to be 22½ feet by Treves<sup>2</sup> and 20½ feet by Coleman.<sup>3</sup> Jensenius<sup>4</sup> believes that 2/3 of the small intestine of dogs can be removed and the animals survive satisfactorily. Haymond<sup>5</sup> reviewed the literature of massive resection of the small intestine in

humans and came to the conclusion that 50% of the entire small intestine can be removed without serious permanent results. Since then, Stanley<sup>6</sup> and Croot<sup>7</sup> have reported three cases in which all of the small intestine, apart from the duodenum and 4 or 5 feet of the jejunum, were removed. Within a year of the operation their patients were leading normal lives. Althausen<sup>8</sup> and Wilkie<sup>9</sup> have described two patients in whom only the duodenum and 6" of jejunum were left *in situ*. They were both alive at the end of 1 and 1½ years, respectively.

Jensenius<sup>4</sup> states that animals seem to tolerate resection of the proximal part of the small intestine better than the distal part. He ascribes this finding to the possibility that the bulk of fat absorption takes place in the distal part of the ileum, but Weckesser<sup>11</sup> was not able to confirm this difference. Greeley<sup>12</sup> and Flint,<sup>31</sup> using both humans and animals, showed that there was no growth in length of the surviving intestine nor was there any regeneration of the crypts or villi. There was considerable hypertrophy of the mucous membrane and increase in the absorbing surface. There was no evidence that the stomach or colon took on any of the functions of the small intestine, however, proximal to the point of resection of the small bowel, absorption rates could be increased almost two fold. Jensenius<sup>4</sup> does not confirm these results, and furthermore he discovered atrophy of the mucous membrane in the stomach and small intestine of his animals. Jackson and Linder<sup>10</sup> carried out extensive investigations on Wilkie's patient. Their studies illustrate the clinical picture in massive resection of the intestine. The patient lost weight rapidly, but after several months stabilized around 90 lb. There were several large bulky bowel movements a day with a volume of almost 6 litres on several occasions. A barium meal demonstrated that the intestinal contents passed from the stomach into the colon in 15 minutes. Signs of vitamin B deficiency appeared in spite of large oral amounts of these preparations. The tongue was smooth and red and there was cheilosis at the corners of the mouth. The skin showed an irregular brown hue on the face and the back of the hands. The pigmentation but not the cheilosis disappeared when large amounts of vitamin B were given. After one year he became psychotic which may have been due to pellagra. Our patient showed personality changes and food crav-



ings, but no overt psychotic manifestations. Hypotension can also develop in these cases.<sup>8</sup>

*Metabolic changes.*—There is decreased absorption of carbohydrate from the small intestine if more than 2/3 of the small intestine is removed in animals.<sup>4</sup> In human subjects, studied by Wildegans,<sup>14</sup> carbohydrate metabolism was not affected, but there was some impairment of protein metabolism. Wilkie's patient<sup>9</sup> showed a slightly positive nitrogen balance and lowering the dietary fat increased the positive nitrogen balance. The bulk of the nitrogen loss was due to the passage of undigested meat fibres into the rectum. Defective fat absorption has been demonstrated in human subjects by Wildegans.<sup>14</sup> Wilkie's<sup>9</sup> patient also suffered from an inability to utilize fats and large amounts of neutral fats were demonstrated in his stools. Presumably the quick passage prevented adequate breakdown of the fats by lipase.

Wilkie's<sup>9</sup> patient showed no vitamin A deficiency, but there was gross vitamin B deficiency (pellagra). He was unable to absorb adequate amounts of vitamin C. No explanation was offered for the facility with which the fat soluble vitamin A was handled in contrast to the poor absorption of the water soluble vitamin C. Our case also showed signs of vitamin B deficiency which responded poorly to large doses of this vitamin.

The serum Ca, K, and Na were normal in Wilkie's<sup>9</sup> patient, but the serum inorganic P was low. There was a slightly negative calcium balance, but the phosphorus balance was in equilibrium. The amount of phosphorus absorbed was increased by giving a low fat diet, but there was no increase in calcium absorption. No calcium balance studies were carried out in our case. However, there was a low serum calcium and a low urinary calcium output presumably, the patient was not absorbing adequate amounts. Doolan<sup>15</sup> found a hypokalaemic alkalosis in a patient with massive resection who was on intravenous therapy and intermittent gastric suction for 66 days. Our patient had a low serum potassium on only one occasion presumably because the diet contained enough potassium to prevent a deficiency.

The only important urinary finding reported in Wilkie's<sup>9</sup> case, was a persistently acid urine. On the other hand, our patient usually showed an alkaline urine. Wilkie's<sup>9</sup> patient did not show a diuretic response to an excessive fluid intake.

Furthermore, the greater part of his urine was passed during the night. Jackson and Linder<sup>10</sup> postulate an absolute or relative excess of the posterior pituitary anti-diuretic hormone to explain the retention of fluids. It has been suggested<sup>17</sup> that diuresis, to some extent, is controlled by a balance between the anterior and posterior parts of the pituitary, the anterior producing a diuretic hormone either directly or via the adrenal cortex, and the posterior an anti-diuretic hormone. This hypothesis is supported by the observation that diabetes insipidus is ameliorated when the anterior pituitary is removed or destroyed. The uninhibited action of the posterior pituitary diuretic hormone may have been one of the factors causing oedema in our patient. The F.S.H. secretion was low indicating depressed function of the anterior pituitary with consequent decreased output of the diuretic hormone.

Several investigators<sup>4, 11</sup> have demonstrated that a hypochromic anaemia eventually occurs in animal or human subjects. Our case supports these observations. Occasionally macrocytosis has been found.<sup>4</sup> This anaemia does not respond to liver and is rarely ameliorated by iron.<sup>4</sup> Wilkie's<sup>9</sup> patient had a mild intermittent hypochromic anaemia, but the bone marrow was normal. The BMR eventually dropped with a concomitant fall in the serum cholesterol. This probably represented an effort to conserve resources. The 17-ketosteroids were slightly lower than would be expected. Our case was similar except that he showed a fall in the plasma proteins.

*Therapy.*—Some investigators<sup>10</sup> claim that these patients should be given a high carbohydrate, high protein and a low fat diet. The reason for the low fat diet is that the body can utilize small amounts better and increasing the fat content does not lead to greater absorption. If the diet contains too much fat large amounts of calcium in the form of calcium soaps are carried with it. Thus the danger of osteomalacia is increased. Large amounts of the vitamin B group and of vitamin C must be given. Weckesser<sup>16</sup> was not able to slow intestinal peristalsis in dogs or to increase intestinal absorption of fat or nitrogen by a vagotomy.

#### SUMMARY

A patient, surviving for 316 days with resection of the intestine from the 3rd part of the

duodenum to the middle of the transverse colon, is presented. The clinical and metabolic findings have been outlined and the literature reviewed.

#### REFERENCES

1. ALVAREZ, W. C.: An Introduction to Gastroenterology, Paul B. Hoeber, New York, 4th ed., 1948.
2. TREVES, J.: *Brit. M. J.*, 1: 415, 1885.
3. COLEMAN, E. P. AND BENNETT, D. A.: *Am. J. Surg.*, 59: 429, 1943.
4. JENSENIUS, H.: Results of Experimental Resection of the Small Intestine of Dogs, NYT Norviak Forlag, Arnold Busch, Copenhagen, 1945.
5. HAYMOND, H. E.: *Surg., Gynec. & Obst.*, 61: 693, 1935.
6. STANLEY, B. E. C.: *Brit. M. J.*, 1: 4754, 1952.
7. CROOT, H. J.: *Brit. M. J.*, 1: 4751, 1952.
8. ALTHAUSEN, T. L., UYEMAMA, K. AND SIMPSON, R. G.: *Gastroenterology*, 12: 795, 1949.
9. WILKIE, W.: *South Africa M. J.*, 24: 516, 1950.
10. JACKSON, W. P., LINDER, G. C. AND BERMAN, S.: *South Africa J. Clin. Sc.*, 2: 1, 3, 1951.
11. WECKESSER, E. C., CHINN, A. B., SCOTT, M. W. JR. AND PRICE, J. W.: *Am. J. Surg.*, 78: 706, 1949.
12. GREELEY, P. W. AND GREELEY, P. E.: *Ill. Med. J.*, 67: 451, 1935.
13. FLINT, J. M.: *Bull. Johns Hopkins Hosp.*, 23: 127, 1912.
14. WILDEGANS, H.: *J. A. M. A.*, 85: 1436, 1925.
15. DOOLAN, P. D., KYLE, L. H., HESS, W. AND PHELPS, E.: *Gastroenterology*, 18: 566, 1951.
16. WECKESSER, E. C., ANKENY, J. L., PORTMANN, A. F., PRICE, J. W. AND CEBUL, F. A.: *Surgery*, 30: 465, 1951.
17. Editorial: *Brit. M. J.*, 1: 517, 1951.

### ACUTE FULMINATING LARYNGO-TRACHEOBRONCHITIS IN AN ADULT

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ACUTE fulminating laryngo-tracheobronchitis in the adult is an extremely uncommon condition. David Davis<sup>2</sup> reported a case in 1936 with a fatal outcome. He stated at that time that all the cases which he had been able to find in the literature occurred in children under 9 years of age but because of the findings in his case he felt it should not be classified only as a disease of childhood.

Neffson and Wishik in their series of 400 cases found the age to range from 3 months to 50 years, with only 11 patients over 16 years of age.

Army Cadet J.H.S. was admitted to the Royal Canadian Naval Hospital, Esquimalt, B.C., October 20, 1952, with a very sore throat and in acute respiratory distress. He had been in his usual state of health the day before and developed a sore throat toward evening. He went to bed but awoke at 4 a.m. feeling acutely ill, his throat very sore, the glands of the neck tender and swollen and having great difficulty breathing. He reported sick and was transferred to the hospital, where he was first seen by one of us at 8 a.m. He was propped up in bed and appeared acutely ill. The inspiratory phase of breathing was noisy and difficult, and he was only able with great difficulty to answer questions with one word at a time. He kept his neck extended and used all accessory

muscles of respiration. His breathing was noisy and very laboured. He was expectorating large amounts of watery mucus containing fresh blood.

His throat was inflamed and the watery mucus seemed to be pouring up from below. The examination of his chest showed markedly reduced air entry, with no evidence of râles or rhonchi. Temperature was 104° per rectum, pulse 128, B.P. 120/60, respirations 30. The cervical glands were swollen and tender but his neck was not sore otherwise. He had no headache.

He was given epinephrine 0.5 c.c., transferred immediately to the ward and given oxygen by mask. As epinephrine appeared to relieve his respiratory distress somewhat, it was repeated every half hour. Oxygen was given constantly by mask and the patient became markedly distressed if the mask was removed for more than a few seconds. 100,000 units of aqueous penicillin was given at 9.45 a.m. and repeated every 3 hours. A smear of the blood-stained watery mucus showed many pus cells (polymorphs) and a few Gram-positive diplococci. W.B.C. was 18,050, differential count not striking.

Sed. Rate 18 mm.; N.P.N. 26 mgm. %; urinalysis S.G. 1.029, Alb. Neg., Gluc. 3 plus; Acetone 2 plus, pH 5.5; Micro. Neg. A blood culture was taken and remained sterile throughout.

By 11 a.m. patient was breathing more easily, but his respiration was still markedly obstructed and oxygen was required. His neck had, however, become generally more swollen. By 1.15 p.m. he began to perspire profusely and his temperature dropped to 100.2° (R). The slight improvement in his breathing was definitely dependent upon whether or not he was receiving epinephrine.

At 4 p.m. he was given 1.0 c.c. of adrenalin in oil. He could now breathe without constant oxygen, maintain a good colour and not feel overly distressed. Oxygen mask was discontinued and he was transferred to an oxygen tent at this time.

At 8 p.m. he was seen by the internist who concurred with the diagnosis of acute laryngo-tracheobronchitis with cellulitis of the neck. The penicillin was increased to 250,000 units q.3 h. Streptomycin therapy was instituted, gm. 1 stat., gm. ss b.i.d.

He was seen by E.N.T. consultant at 8.30 p.m. at which time he was an excellent colour, feeling very much improved, breathing fairly quickly but still with an obstructive element. He was still coughing up a moderate amount of watery mucus which was no longer blood-tinged. Having had only a few hours sleep in 48 hours he was overcome with fatigue and dozed intermittently only to awake and cough from time to time.

At 9 p.m. morphine sulphate gr. ¼ and atropine sulphate gr. 1/150 were given. One-half hour later he was sleeping, and breathing fairly quietly. His colour was excellent. Pulse 100, temp. 100.2° (R). It was felt that since he had shown steady improvement he was probably over the critical stage.

At 10 p.m. his breathing became suddenly rapid and laboured. He became markedly cyanotic and lapsed into unconsciousness. Immediate preparations were made for a tracheotomy in the operating room. In the meantime he was extremely cyanotic, unconscious, and exhibited a heaving obstructive type of respiration, 12/min. Corneal reflex was active, generalized spasm plus carpal spasm were present. Constant suction gave no improvement but produced free blood. The plan was to wait until respirations practically ceased and spasm subsided, then insert an intratracheal tube by direct vision laryngoscopy. When this point seemed imminent, the patient suddenly began to have free air entry. Suction was continued and colour rapidly returned to normal. Patient could indicate by a nod that consciousness had returned. Five minutes later he became cyanotic again and unconscious. Once again suction returned both colour and consciousness.

At 11.20 p.m. a tracheotomy was completed under local anaesthetic with the anaesthetist giving oxygen. One minute after the tracheotomy tube was inserted the patient was quite cheerful and remained a good colour without oxygen. Sulfa powder was sprinkled into the



wound to partially compensate for the hurried surgical preparation.

On the first postoperative day 3,000 c.c. of fluid were given intravenously. The patient was able to swallow only slightly and 700 c.c. were taken by mouth. On the next day his temperature remained at 102.4 (R), in spite of penicillin and streptomycin. As he could now swallow fluid easily, special small capsules of aureomycin containing 100 mgm. were made and aureomycin gm. ss stat., 400 mgm. q.6 h. was commenced. Temperature was normal after 48 hours and remained so. The tracheotomy tube was removed on the third postoperative day and the incision healed rapidly. Patient was on a full diet by the seventh postoperative day.

The bloody secretions from the throat were cultured. Only a few pneumococci and staphylococci (*aureus*) were grown. The urine on the first postoperative day contained albumin 40 mgm. % but was thereafter negative. On the ninth postoperative day the white cell count was 7,200, with normal differential.

On the fourth postoperative day the larynx was examined under direct vision laryngoscopy using 2% topical pontocaine. The larynx showed moderate oedema of the false cords and arytenoids, with the true cords just visible distally. They were symmetrical and remained widely open during the examination with ample space for air entry. The picture was one of generalized subsiding oedema of the larynx. The larynx later examined by indirect vision appeared normal.

#### COMMENT AND DISCUSSION

The subject of acute laryngo-tracheobronchitis has been so well covered by Major A. H. Neffson<sup>1</sup> that it is not the purpose of this report to add anything but, in the light of this unusual case, to merely make some further comments.

Once this condition was finally separated as a distinct clinical entity the main obstacle in the way of diagnosis as stated by Neffson was the tendency to exaggerate the extent of the involvement in a given instance, that is, cases of simple obstruction, laryngitis or laryngo-bronchitis being diagnosed as acute laryngo-tracheobronchitis. This he states has occurred because of the difficulty in estimating the true status, lack of familiarity with the problem peculiar to the diagnosing of this condition, and a natural propensity on the part of some of our colleagues to prove their abilities in the face of great odds. The diagnosis of acute laryngo-tracheobronchitis requires clear proof of non-diphtheritic infection involving the larynx, trachea and bronchi, causing serious obstruction to breathing. The diagnosis of bronchial involvement must be based on profuse and repeated outpourings of secretions which results in repeated blocking of the airway.

The decrease of mortality since the advent of antibiotics has been marked, but so has the general understanding of the disease and supportive therapy, so that Neffson issues a word of warning and stresses supportive therapy even with anti-

biotics. Most authors, it is stated, argue that morphine and atropine are definitely contraindicated. Although throughout the literature on this condition the use of epinephrine has been conspicuous by its absence, it was used freely in our case and apparently produced a most beneficial effect. Surgical treatment, instituted only when medical treatment has failed, consists of aspiration, intubation and tracheotomy with direct laryngoscopy a necessary adjunct in each instance. Opinion varies with regard to these methods but postoperative suction directed toward the removal of plugs of mucus capable of producing obstruction is considered by Neffson to be the more important part of tracheotomy. Morphine and atropine were given on the suggestion of the E.N.T. specialist, at a time when the patient seemed to be over the critical stage, but with secretions still watery. He slept almost directly after his injection with quiet, easy breathing. Coincident or otherwise it was one hour after this administration that the patient became suddenly obstructed, rapidly cyanotic and unconscious.

Tracheotomy although not always the final answer proved to be a lifesaving measure in this particular case. In children it is generally advised that in case of croup in which there is doubt as to the nature of the infection, the condition of the cords should be determined by direct laryngoscopy under skilled supervision. The fulminating nature of this case made this impossible at first. In the light of future developments one thinks in retrospect that the fact that we were lulled into a feeling of security as the patient continued to improve, without determining the state of the cords, might have caused his death. As it was we stood by with a laryngoscope as he sunk into unconsciousness. A tracheotomy was necessary to save his life. It may well have been done less dramatically beforehand.

#### REFERENCES

1. NEFFSON, A. H.: *Am. J. M. Sc.*, 208: 524, 1944.
2. DAVIS, D.: *Arch. Otolaryng.*, p. 687, June, 1936.

There is no question but that the induction of labour can be done with relative safety on properly selected patients by properly qualified physicians but regardless of who performs the procedure an unavoidable risk is added for the mother and her infant. This risk is increased many times if all possible precautions are not taken. Because there is no proof that either fetal or maternal mortality is improved by induction of labour in normal pregnancy at term there is no justification for its use.—J. R. Willson: *Am. J. Obst. & Gynec.*, April, 1953.



## Special Article

### THE USE AND ABUSE OF PREPAID COMPREHENSIVE PHYSICIANS' SERVICES\*

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THE PROVISION of comprehensive physicians' services, that is, general practitioner and specialist care in the home, office, and hospital through medical care insurance, is a subject of increasing public and professional interest. For the most part, plans providing comprehensive physicians' services are sponsored by consumer co-operative associations, such as the Group Health Co-operative of Puget Sound; by community-wide non-profit organizations such as the Health Insurance Plan of Greater New York; and by employee mutual benefit associations or labour unions, such as the Labour Health Institute of St. Louis. Typically these plans use group practice organizations to provide physicians' services.

On the other hand, relatively few of the 77 Blue Shield plans, based on the individual practice of medicine, provide similarly comprehensive physicians' services. Many Blue Shield plans, however, are cautiously approaching this type of benefit structure by providing surgical care in the physician's office and the patient's home for specified procedures or up to specified cash payments. The restricted benefit structure of the Blue Shield plans has, in general, been attributed, first, to the lack of actuarial data on which to base premiums, and second, to the unfavourable early experience of several plans which offered comprehensive physicians' services. In these comprehensive plans, since discontinued, the excessive demand for physicians' services is generally regarded as abuse of service by the subscriber.

Utilization data from comprehensive physicians' service plans are available, but this information is largely from plans based on group practice, where the participating physicians are paid on other than a fee-for-service basis. While there are compelling advantages in group practice both to the physician and the patient, the fact remains that only about 3% of physicians in the United States are engaged in group practice. In our opinion it is unlikely that a large

proportion of the physicians in this country will in the near future either be engaged in this form of practice or be participating in prepaid medical care plans where payment is *not* on a fee-for-service basis.

It therefore seems worthwhile to analyze, with reference to the use and abuse of physicians' services, the experience of a prepaid comprehensive physicians' services plan in which the participating physicians are in individual practice and are paid by the fee-for-service method. Such a plan, Windsor Medical Services, of Windsor, Ontario, Canada, a voluntary, nonprofit prepaid medical care plan sponsored by the Essex County Medical Society, was chosen for study. The objectives of this study were, first, to obtain utilization data on the receipt of comprehensive physicians' services, and second, to evaluate the extent of abuse of service by the subscribers.

Windsor Medical Services has been in operation since 1939, enrolling subscribers in Essex and Kent Counties. Single individuals and family heads are enrolled in groups of 10 or more having a common employer, or as 75% or more of the workers in larger employed groups. Dependents, including children under the age of 21 and adult relatives under 60 years of age, are covered. The plan has shown a progressive increase in membership and by May, 1951, there were over 100,000 subscribers. This enrollment represents over 50% of the total population of the Windsor metropolitan area.

Two types of contracts are offered: a limited surgical, and a comprehensive physicians' services contract. Only 1,500 of the more than 100,000 subscribers have chosen the limited surgical contract. The preference shown by the subscribers of this plan for the comprehensive contract is striking in view of the negligible interest in such coverage attributed to Blue Shield subscribers. The question naturally arises: Is this lack of interest an expression of subscriber satisfaction with the limited contract offered by the typical Blue Shield plan? Or is it rather the inability of the subscriber to make known his preference for a comprehensive contract when only a limited contract is available?

The comprehensive contract in the Windsor plan provides general practitioner and specialist care for subscribers and their dependents in the home, doctor's office, and hospital. Included are complete maternity service with prenatal and postnatal care, well baby care, immunizations, annual physical examinations, x-ray examinations and treatment, and refractions. There are no age limits, no exclusions of pre-existing illnesses, no extra charges, not even for night calls. There are, however, waiting periods of 10 months for maternity service, 6 months for pre-existing conditions, and 12 months for annual physical examinations and refractions. Hospitalization benefits are not included, but a majority

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of the subscribers are concurrently enrolled in the Blue Cross plan sponsored by the Ontario Hospital Association.

Laboratory services other than those performed by a physician in his office are not provided, nor are any nursing, dental, or drug benefits. There are the usual exclusions for treatment for illness covered by Workmen's Compensation, drug addiction, acute alcoholism, and chronic conditions requiring care in an institution other than a general hospital.

More than 95% of the physicians in the Essex County Medical Society participate in the plan. Physicians are paid on a fixed schedule of fees for each service rendered a subscriber, and agree to accept these fees as payment in full for single subscribers with annual incomes of \$3,000 or less, and for family subscribers earning \$6,500 or less. These income limits are established at levels which, in the Windsor area, mean that almost the entire enrolled population receives benefits on a service basis, that is, without additional charges by their physicians.

The monthly premium for the comprehensive contract is \$1.85 for a single employee, \$3.70 for man and wife; \$5.00 for a family with one child; \$6.10 for a family with two children; \$7.00 for a family with three or more children.

#### PLAN OF STUDY

The procedures used in collecting data from a prepaid medical care plan depend largely on the records used in administering the plan. In the Windsor plan there are two basic documents, a physician's service card and a subscriber's medical service ledger card. The physician's service card, a specially designed I.B.M. punch card, has spaces to record the subscriber's name and contract number, the physician's diagnosis, the services rendered, and the physician's fee for these services. Each physician submits one of these cards monthly for each subscriber to whom he has given care during the month. This card serves as the physician's bill to the plan and is the only record required of him.

In the central office, the information from these physician's service cards is transcribed to the subscriber's medical service ledger cards. One of these ledger cards is maintained for each family or single subscriber. Each ledger card contains a complete record of service including diagnosis, date, number, and type of all the physician's services received by each member of the family.

Much of the information required for the study could easily be obtained from the routine tabulations of the physician's service cards. However, certain data could be secured only by reference to the subscriber's medical service ledger cards. Preliminary estimates showed that these data could be obtained with desired accuracy from a sample of approximately 1,250 of the subscribers in the plan. A probability

sample was selected from the alphabetic file of the subscriber's medical service ledger cards by making a random selection of file drawers and then systematically selecting names of individuals from the cards in the selected drawers. For each individual selected for the sample, a record of all physicians' services received during the study period, October 1, 1949, to September 30, 1950, was transcribed.

Since there was considerable information for the total enrolled population from which the sample was drawn, it was possible to make a number of comparisons between data from the sample and from the total enrolled population. Table I shows the results of comparing the age and sex distributions. The same ratio of male to female subscribers was found in the sample as

TABLE I.

COMPARISON OF ENROLLED POPULATION WITH SAMPLE OF 1,260 SUBSCRIBERS, BY SEX AND AGE GROUPS, WINDSOR MEDICAL SERVICES, JULY 1, 1950

<i>Sex</i>	<i>Percentage</i>
Female:	
Enrolled . . . . .	51
Sample . . . . .	51
Male:	
Enrolled . . . . .	49
Sample . . . . .	49
<i>Age</i>	
0-14 years:	
Enrolled . . . . .	29
Sample . . . . .	28
15-49 years:	
Enrolled . . . . .	57
Sample . . . . .	59
50 and over:	
Enrolled . . . . .	14
Sample . . . . .	13

in the total enrolled population. For the age group 0 to 14 years, the difference between the sample and the total enrolled population was 1 percentage point. In the age group 15 to 49 years the difference was 2 percentage points. The difference for the age group 50 years and over was 1 percentage point.

These comparisons are examples of the magnitude of the sampling variations. In all cases for which calculations were made, the sampling errors were found to be sufficiently small so that the conclusions drawn concerning the total enrolled population may be accepted with confidence.

#### SERVICES RECEIVED

Data on the services received by the total enrolled population were readily available from the routine records of the plan. The utilization of services by the average enrollment of 81,902



subscribers for the year 1950 is shown in Table II.

There was a total of 3,940 physicians' services per 1,000 subscribers in 1950. "Physicians' calls"—office, home, and hospital—do not include major or minor surgical procedures, the administration of anaesthetics, deliveries, radiologic procedures, or refractions, and were rendered at an annual rate of 3,443 physicians' calls per 1,000 subscribers. Physicians made 1 home call for every 5 office calls. The rate of hospital calls, 346 per 1,000 subscribers or 10% of all physicians' calls, is understated because routine post-operative hospital visits are included as part of the surgical or obstetrical procedure and are not recorded separately.

TABLE II.

UTILIZATION OF SERVICES BY ALL SUBSCRIBERS, WINDSOR MEDICAL SERVICES, 1950		
Item of service	Annual rate per 1,000 subscribers	
All services	3,940	
Physicians' calls	3,443	
Office calls		2,551
Home calls		546
Hospital calls		346
Surgical procedures	268	
Tonsillectomy and adenoidectomy		25
Reduction of fractures		13
Appendectomy		8
Dilatation and curettage		6
Gynaecological surgery		5
Herniorrhaphy		3
Haemorrhoidectomy		2
All other major surgery		12
Minor surgery		116
Anaesthetics		78
Deliveries	26	
Radiologic services	141	
X-ray diagnostic procedures		101
Other radiologic		40
Refractions	61	
All others	1	

Seven surgical procedures—tonsillectomy, reduction of fractures, appendectomy, dilatation and curettage, gynaecological surgery, herniorrhaphy, and haemorrhoidectomy—account for over 80% of all major surgery. Gross comparisons of the rates for these seven operative procedures, using the limited data available from other medical care plans, suggest that tonsillectomy alone appears to be performed with greater than customary frequency. By definition, minor surgery includes all surgical procedures listed in the fee schedule at less than \$50, excepting tonsillectomy, reduction of fractures, and dilatation and curettage. Three per cent of the deliveries were by Caesarean section.

Age-sex specific utilization rates for all physicians' services, including physicians' calls, surgical procedures, deliveries, radiologic services, and refractions, are shown in Table III. Females

have a higher utilization rate than males, as a whole—4.4 services per female subscriber per year, as against 3.0 for male subscribers, and for each age group except that under 10 years. The age groups 50 to 59 years and 60 years and over have utilization rates significantly higher than the younger age groups, but even the rate for the age group 60 years and over is not sufficiently high to justify excluding this group from enrollments.

Table IV shows the distribution of costs for the several types of physicians' services. Over half the total cost of all services rendered is ac-

TABLE III.

UTILIZATION OF SERVICES BY SAMPLE OF 1,260 SUBSCRIBERS, BY AGE AND SEX, WINDSOR MEDICAL SERVICES, OCTOBER 1, 1949, TO SEPTEMBER 30, 1950			
Age	No. of services per subscriber per year		
	Total	Male	Female
Total	3.7	3.0	4.4
Under 10 years	4.1	4.5	3.6
10-19 years	2.4	1.9	2.8
20-29 years	3.7	2.1	5.0
30-39 years	3.6	2.1	4.9
40-49 years	3.8	2.4	5.4
50-59 years	4.6	3.8	5.6
60 years and over	5.7	*	*

\*Sample too small for reliable rates.

TABLE IV.

DISTRIBUTION OF COSTS BY TYPE OF SERVICE FOR ALL SUBSCRIBERS, WINDSOR MEDICAL SERVICES, 1950	
Type of service	Percentage of total cost
All services	100
Physicians' calls	47
Major surgery, including anaesthesia	32
Minor surgery	5
Deliveries	6
Radiologic services	8
Refractions	2

counted for by physicians' home and office calls, radiologic services, and refractions. Physicians' care for hospitalized patients—that is, hospital calls, major surgery, including anaesthesia, and deliveries—takes about 40% of the total cost. This distribution of costs suggests that the typical Blue Shield plan, limited to physicians' care for hospitalized patients, meets less than half the cost of physicians' care required by subscribers.

#### ABUSE OF SERVICE

There is much speculation regarding the extent of abuse of service by subscribers of comprehensive physicians' service plans, due in large part to lack of data. In the Windsor plan certain



relevant data were available from the routine tabulations of physicians' service cards; other data had to be obtained from the sample of the subscriber's medical service ledger cards.

Table V shows the utilization of all physicians by subscribers during the study year. Even though physicians' services were freely available to them, 39% of the subscribers did not see a physician during the study year; 36% saw only 1 physician; 15% saw 2 physicians, and 10% saw 3 or more.

Now there is no doubt that "shopping around" for physicians, a particularly virulent form of abuse of service, occurs in prepayment plans just as it does when payment is made out of pocket. One per cent of subscribers in the Windsor plan saw more than 4 physicians in the 12 month period under study. That not all these subscribers are utilizing physicians' services indiscriminately is illustrated by the following case report: A 47 year old woman, a Windsor Medical Services subscriber for over 2 years, uses Dr.

TABLE V.

UTILIZATION OF ALL PHYSICIANS BY 1,260 SUBSCRIBERS IN SAMPLE, WINDSOR MEDICAL SERVICES, OCTOBER 1, 1949, TO SEPTEMBER 30, 1950

No. of physicians seen	Percentage of subscribers
None	39
1	36
2	15
3	6
4	3
More than 4	1

A as her family physician. During the period of study in October, 1949, a thyroidectomy for a nodular goitre was performed by Dr. B, a surgeon. The anæsthetic was administered by Dr. C. In March, 1950, the patient was treated for influenza by her family physician, Dr. A. In June, 1950, the patient was given a complete ophthalmological examination including a refraction, by Dr. D. The following month, the patient was again treated by her family physician, Dr. A, this time for a spastic colon. She was referred by him to a radiologist, Dr. E, for an x-ray of the colon with a barium enema. This subscriber received care from 5 different physicians in a 12 month period, but when the illness experienced and the physicians' services received are taken into consideration it does not appear that "shopping around" occurred in this case. The Windsor experience does not support the contention that "shopping around" by subscribers constitutes a problem of such major proportions that physicians' service plans should be restricted to surgery and in-hospital care.

The striking thing about the data presented in Table V is not that 1% of subscribers saw

more than 4 physicians, but that 39% saw no physician in the plan in a 12 month period. Forty per cent of these subscribers were 40 years of age and over. Their health status is of course, unknown, since they received no physicians' services during the year of study. One wonders, however, how many preventable, controllable, or remediable conditions remained undetected and without care, particularly among those subscribers in the middle and later years. From the standpoint of preventive medicine, in the Windsor plan at least, there is under-utilization rather than abuse of service. Removal of economic barriers to the receipt of comprehensive physicians' services is not necessarily followed by a deluge of patients.

Another reason frequently given for restricting physicians' services in prepaid plans to in-hospital care is the firmly held belief that subscribers will make unreasonable demands for medical attention outside of ordinary hours. Even comprehensive physicians' service plans

TABLE VI.

UTILIZATION OF SPECIALISTS BY 769 SUBSCRIBERS IN SAMPLE RECEIVING PHYSICIAN'S CARE, WINDSOR MEDICAL SERVICES, OCTOBER 1, 1949 TO SEPTEMBER 30, 1950

No. of specialists seen	Percentage of subscribers
None (general practitioners only)	58
1 specialist	31
2 specialists	8
3 or more specialists	3

regularly impose barrier payments as deterrents to such subscriber demand. The only extra charge for physicians' services in the Health Insurance Plan of Greater New York is a \$2 charge for a night call requested and made between 10 p.m. and 7 a.m. In the Windsor Medical Services, where there is no such charge, it was found that during the study year fewer than 3% of subscribers received night calls, that is, a physicians' home-call made between the hours of 10 p.m. and 8 a.m. There were only 42 night calls per 1,000 subscribers during the study year. Although Windsor subscribers may, with no extra charge, call a physician at any time of day or night, there is nothing here to suggest abuse of service.

Table VI relates to the 61% of subscribers who received physicians' services during the study year. Over half, or 58%, saw general practitioners only; 31% saw 1 specialist; 8%, 2 specialists; and 3%, 3 or more specialists. Thirty per cent of the subscribers who received care from a specialist were not seen by a general practitioner during the study year. A subscriber's record indicating physicians' services from both a general practitioner and a specialist does not

necessarily imply a referral. It is probable, therefore, that the percentage of subscribers who received specialist care without being referred by a general practitioner is larger than 30%.

Abuse of service is sometimes interpreted as the excessive and uncontrollable demand made by newly enrolled subscribers for physicians' services, arising from a backlog of unmet medical need. This interpretation makes prepayment plan administrators cautious in eliminating restrictions on physicians' services and is used to justify waiting periods for pre-existing conditions. The experience of two other plans providing comprehensive physicians' services is relevant in this connection. In the Health Insurance Plan of Greater New York, where there are no waiting periods or extra charges for pre-existing conditions, subscribers usually have a higher utilization rate for a short time after they join the plan and the rate tends to drop later to a level characteristic of all subscribers.<sup>1</sup> In the Permanente Health

ditions and 10 months for maternity care, so that it is not possible to evaluate completely the utilization rates of subscribers in the plan for less than 1 year. The data presented in Table VII relate length of membership to cost of service. They are not consistent with the assumption that the demands made by new subscribers are uncontrollable when comprehensive physicians' services are offered. The 21% of subscribers in the sample who joined the plan during the study year account for 9% of the total participant-months at risk and also for 9% of the total costs of service. The 14% who, at the time of the study, had been enrolled in the plan for 1 to 2 years account for 16% of the total participant-months at risk and 15% of the total costs. For no group of subscribers classified by length of membership is there a significant difference between the percentage of total participant-months at risk and the percentage of total cost of service. It is evident that the Windsor plan is not over-

TABLE VII.

RELATION OF LENGTH OF TIME IN PLAN AND COST OF SERVICES FOR 1,260 SUBSCRIBERS IN SAMPLE, WINDSOR MEDICAL SERVICES, OCTOBER 1, 1949 TO SEPTEMBER 30, 1950

<i>Time in plan and No. of subscribers</i>	<i>Participant months at risk and total cost of service</i>
Less than 1 year (263, or 21% of subscribers):	Participant mos.: 9% Total costs: 9%
1-2 years (181, or 14% of subscribers):	Participant mos.: 16% Total costs: 15%
2-3 years (413, or 33% of subscribers):	Participant mos.: 38% Total costs: 38%
3-4 years (265, or 21% of subscribers):	Participant mos.: 24% Total costs: 26%
More than 4 years (138, or 11% of subscribers):	Participant mos.: 13% Total costs: 12%

Plan, in which there are likewise neither waiting periods nor extra charges for pre-existing conditions in group subscribers, lowest utilization rates are found, in general, among persons with the longest period of membership. For some age-sex groups in the Permanente Plan no pattern of utilization in relation to length of membership is evident. However, for those groups where there is 100% enrollment, as in labour union health and welfare agreements, utilization rates are *lowest* during the first year of membership and gradually increase as the subscriber becomes educated to the benefits to which he is entitled.<sup>2</sup>

This lag in the utilization of benefits has also been observed in the Rhode Island and California compulsory disability insurance programs, and to the degree to which it may be operative in medical care plans, it would depress utilization rates among new subscribers even where no waiting periods exist.

The Windsor plan, as previously noted, has waiting periods of 6 months for pre-existing con-

TABLE VIII.

RELATION OF LENGTH OF TIME IN PLAN TO THE PERCENTAGE OF 964 SUBSCRIBERS IN SAMPLE FULL 12 MONTHS OF STUDY RECEIVING PHYSICIANS' SERVICES, WINDSOR MEDICAL SERVICES, OCTOBER 1, 1949 TO SEPTEMBER 30, 1950

<i>Time in plan</i>	<i>Percentage of subscribers receiving services</i>
1-2 years	70
2-3 years	71
3-4 years	70
More than 4 years	71

burdened by new subscribers making excessive demands for service. Waiting periods afford the administrator sufficient control to permit comprehensive physicians' services to be offered.

Table VIII shows the relationship between length of membership and the receipt of physicians' service, measured by the percentage of subscribers receiving such service. It is based on an analysis of the records of those subscribers in the sample who were in the plan for the entire year of study. The differences among the groups are less than would be expected from sampling variations and are not statistically significant. In this plan, "seasoning" of subscribers beyond the first year of membership is not evident.

Another approach to the evaluation of abuse of service lies in measuring the number of physicians' services received in behalf of certain conditions for which generally accepted standards exist. For example, the accepted standard for an uncomplicated, full-term pregnancy is 8 to 10 prenatal calls and, following delivery, 1 or 2 post-partum calls. For the total subscriber population in 1950, there was an average of a total of 8 such calls for each delivery. Measured by



standards of acceptable obstetrical care, there was no over-utilization of service among the childbearing subscribers in the Windsor plan.

Basically, the extent of abuse of service must be measured, in large part at least, against subscriber morbidity experience which is an expression of need for physicians' services. The problems involved in the collection, analysis and interpretation of morbidity data from prepaid medical care plans have been pointed out by Deardorff and by Weissman and will be more fully discussed by the present authors in a subsequent paper. Suffice it to say here that the amount of illness recorded in prepaid plans providing comprehensive physicians' services measures only that portion of the medical care needs of the subscriber population that comes to the attention of the physician in the plan and is recorded by him. Illness not receiving physician's care, whether the subscriber recognizes the illness as such or not, is not measured. There also are not taken into account those illnesses for which there are sources of physician's care outside the plan, such as in-plant industrial medical services, Workmen's Compensation, health department clinics, veterans' medical facilities, and others. In short, the morbidity data obtained from prepaid plans does not represent the total illness experience of the subscriber population. To the extent to which total illness is understated, these morbidity data fail to indicate the total need for physicians' services and have limited usefulness in evaluating the extent of abuse of service by subscribers.

#### CONTROLS ON ABUSE OF SERVICE

The data thus far presented fail to give evidence that abuse of service by subscribers occurs to any extent. It cannot be stated with certainty that no subscribers make demands for "unnecessary" and excessive physicians' services. But if such abuse occurs, it does not constitute a major administrative problem. This is not to say that the Windsor plan is without administrative controls on abuse of service. There are such controls; they focus, however, on the participating physicians rather than on the subscribers. Instead of trying to limit the services subscribers may seek, the plan controls the services the physicians render. This orientation toward abuse of service is not frequently observed in prepaid plans based on fee-for-service payment, but the Windsor experience points to its validity.

Briefly, controls on abuse of service by physicians are applied as follows: Bills submitted for multiple services are reviewed by a committee of participating physicians. Only bills for home, office, and hospital calls are subjected to this review. Bills for major and minor surgery, radiologic services, refractions, and all other special services are routinely scrutinized only for conformity with the fee schedule. Multiple services

to a subscriber are considered in the light of the condition for which these services have been rendered and an attempt is made to arrive at a proper level of service according to patterns of practice generally followed by the physicians in the plan. If the services rendered a subscriber are judged to be excessive, the committee approves payment only for that number of services considered necessary.

In 1950 the reviewing committee reduced the total amount of all physicians' bills submitted for home, office, and hospital calls, by about 6%. In view of the relatively small amounts by which physicians' bills are reduced, one wonders whether psychological factors resulting from the knowledge that a system of controls exists are not a more effective control device than the committee's review of physicians' bills.

Decisions by a reviewing committee are in general accepted without protest and the effectiveness of this relatively simple control procedure is recognized by the administrators of the plan. Nevertheless, they have expressed dissatisfaction with this form of control. It is arbitrary and subjective. Since it is not based on objective criteria, it cannot always be applied in a consistent fashion. For these reasons there has been under study for some time the development of a control formula based on a statistical analysis of physicians' services. Such a control formula would overcome the objections to the present control procedure and would have wide applicability to other comprehensive plans paying physicians on a fee-for-service basis.

#### SUMMARY

A year's experience of Windsor Medical Services, a comprehensive plan based on individual practice with participating physicians paid on a fee-for-service basis, is presented.

Analysis of the services received indicates that abuse of service of subscribers is minor. Excessive demands for service, "shopping around" for physicians, unreasonable requests for medical attention outside regular hours, and overutilization of service by newly enrolled subscribers are not administrative problems of major proportions.

The contention that physicians' services must be restricted to care for hospitalized patients because of abuse of service by subscribers is not supported by the experience of this plan.

Acknowledgment is gratefully made to the Board of Directors and administrative staff, Windsor Medical Services, for their co-operation.

#### REFERENCES

1. BAEHR, G.: Professional Services Under Medical Care Insurance, *A. J. P. H.*, 41: 2:139 (Feb.), 1951.
2. WEISSMAN, A.: A Morbidity Study of the Permanente Health Plan Population, *Permanente Found. Med. Bull.*, 9:1 (Jan.), 1951.

## Clinical and Laboratory Notes

### THE USE OF PARENTERAL GRAVOL FOR POST-ANÆSTHETIC VOMITING\*

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VOMITING, either during operation or postoperatively, is always unpleasant for the patient, surgeon or anaesthetist. In some instances, particularly during anaesthesia, it may be troublesome or even hazardous. A drug having no unpleasant or dangerous side-effects which could adequately prevent vomiting would be useful and welcome.

Since dimenhydrinate was first introduced a few years ago for the symptomatic treatment of motion sickness<sup>1</sup> there have been numerous encouraging reports of its use, orally, in this and other conditions involving nausea and vomiting such as radiation sickness,<sup>2</sup> pregnancy,<sup>3</sup> electroshock therapy,<sup>4</sup> and with aureomycin.<sup>5</sup>

TABLE I.

Group	Vomiting		Vomiting on basis of anæsthetic used		
	Operative	Post-operative	Nitrous oxide	Ether	Pentothal
Gravol, 100.....	0/100	9/100	7/82 (8%)	2/17 (12%)	0/1
Control, 100.....	3/100	23/100	17/72 (24%)	5/16 (31%)	1/12 (8%)

Millet and Henry<sup>6</sup> reported on the oral use of this drug in a series of 69 patients undergoing orthopaedic procedures. There was no vomiting and only 4 complaints of nausea. Whereas 16 out of 25 had been nauseated or had vomited when anaesthetized for similar operations previously, only 2 of these 25 individuals were nauseated when pre-treated with dimenhydrinate. Rubin *et al.*<sup>7</sup> reported on postoperative nausea and vomiting in a series of 250 patients: half of these received 100 mgm. dimenhydrinate by mouth before the anaesthetic and usually again after recovery from anaesthesia—either by mouth or by rectum. In the untreated control group there was a 62% incidence of vomiting within an 8 hour observation period: in the group receiving dimenhydrinate this was reduced to 26%.

Although we have used this drug in both tablet and rectal suppository forms for post-anaesthetic vomiting we believed that the injectable Gravol† which recently appeared would

permit a more precise evaluation of its efficacy. Accordingly, the following study was undertaken.

#### EXPERIMENTAL METHOD

In the present series there was a total of 200 unselected cases. Of these, 100 received Gravol solution preoperatively, and postoperatively when indicated, either intravenously or intramuscularly in dosage of 2.5 to 5.0 c.c. (*i.e.* 25 to 50 mgm.). The control group of 100 received no anti-emetic medication. In both groups there were approximately twice as many females as males. Ages ranged from 9 months to 71 years in the treated group, and from 3 to 74 years in the controls.

In the group receiving Gravol there were 68 cases requiring major surgery and 32 minor: in the controls these were 55 and 45 cases, respectively.

Nearly all patients in both groups received pre-anaesthetic medication with atropine and morphine, either alone or combined. Many received curare during operation.

Anæsthetics used in the Gravol-treated group were: nitrous oxide, 82; ether, 17; pentothal, 1. In the control group these were: nitrous oxide, 72; ether, 16; pentothal, 12.

In order to keep the results for this report

as objective as possible we limited ourselves to recording vomiting only—neglecting nausea—over a period of about 12 to 15 hours from the start of operation.

#### RESULTS

No toxic or unpleasant effects, either general or local, were noted by intravenous or intramuscular injection. In the untreated control group 3 patients vomited during operation and 23, including these same 3 individuals, vomited postoperatively. In the group receiving Gravol none vomited during operation and only 9 vomited postoperatively.

These results, as well as a break-down of vomiting on the basis of anæsthetic used, are summarized in Table I.

#### CONCLUSIONS

From the results of this study we can say:  
1. Gravol administered intravenously or intramuscularly in dosage of 25 to 50 mgm. is free from toxic or unpleasant side-effects.

(Concluded on page 459)

\*Memorial Hospital, St. Thomas.

†A solution of dimenhydrinate, 10 mgm./c.c., in 10% ethyl alcohol, manufactured by Frank W. Horner Limited, Montreal.



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(Information regarding contributions and advertising will be found on the second page following the reading material.)

## Editorials

### THE FIRST WORLD CONFERENCE ON MEDICAL EDUCATION

Probably no country has ever yet taken the time to stand back and look appraisingly at methods of medical education. Certainly, there has never yet been any attempt to do this on an international scale. The need was there but not the impetus to meet it. Now the first World Conference on Medical Education has been held, and whatever else may be said there is no doubt that judging by the intense and sustained interest shown in its proceedings it has justified its creation from beginning to end.

The Conference was the direct product of the World Medical Association; not the first of its labours but perhaps one whose significance is most readily grasped. No other organization could have developed a meeting of such international nature; and it may be added perhaps that the W.M.A. has only just reached the stage of growth at which it could successfully bring it about. Even so, the project was launched, not with doubt as to its need so much as uncertainty as to the response it would obtain. Its immediate organizers in London had no precedent by which to estimate this response beforehand, and it is only one proof of the admirable work of the organizers that it was possible to handle satisfactorily the quickly expanding numbers in attendance.

But this unexpected response more than repaid the heavy labours of the conference. If ever such another conference is held—and in due time there probably will be—a wealth of organizing experience will be available. And let it be said clearly and at once that the practical details were carried out by the British Medical Association, with Dr. Hugh Clegg and Dr. Gret Turner as

twin beacons of unvarying constancy. London itself took no small part in the proceedings, and those at the Conference will not easily forget the warmth of the welcome from the Ministry of Health and the London County Council.

What was done at the meeting, and how will it affect medical education? The first question can only be adequately answered by saying that a full report of the proceedings is to be published in book form. Several of the papers have already appeared in the *British Medical Journal*, and should be read with attention. Amongst material of high order two papers stand out, those by Sir Richard Livingstone on "What is Education?", and by Sir Lionel Whitby on "The Challenge to Medical Education in the Second Half of the Twentieth Century". There was in these quality of ripe wisdom and experience which was continually recalled by speakers throughout the Conference.

But excellence of introduction was not enough. After the opening general themes we were immediately introduced to the inescapable problems of medical teaching itself. Simplify these as one might try, their solution has not yet been reached. Take the teaching of anatomy and physiology. The emphasis here was not so much on cutting down the time devoted to them as it was to the close integration of the two in their presentation to the student. At once the unique value of the international nature of the conference became apparent in the pooling of the experience of various medical centres (Birmingham in particular) in trying to achieve this co-ordination. The combined teaching of medicine and surgery was another instance of suggested co-ordination; perhaps more difficult to do, but not impossible and already being explored.

Difficult as it may be to summarize such a many-sided occasion, it may at least be said that even if little new was suggested there was a definite shaking-up of the subject—of seeing what was likely to be most durable and in what directions change could be attempted. There will be only frustration in store for those who expect that this Conference will bring about rapid and far-reaching changes. Its object was not to give final answers to the problems surrounding the teaching of medicine, but rather to provide for interchange of thought and experience on the widest possible scale. It is indeed a long term project to change methods of teaching medicine. As one speaker said, it was

easier to change a tombstone than to alter medical teaching.

Should we expect changes especially in the younger and smaller medical schools? It may well be that they have less tradition to overcome, but actually some of the keenest criticism came from large and long established schools. One thing, however, seems clear. No matter how earnestly a dean or faculty may desire to adjust teaching to modern conditions, little or nothing can be accomplished without the co-operation of those who do the teaching. One of the most provocative of the subjects dealt with was the teaching of the teacher to teach. Our teaching of medicine in great part is haphazard. How often do clinical teachers seriously discuss how they might amongst themselves alter and improve methods of teaching? But how else will the ferment of change spread?

The student himself—that perpetually changing constant—was of course the object around which most of the discussion revolved. It might have been interesting — if practicable — to have had some students there. They might occasionally have reversed the point of view. Whatever they might have concluded however, would have been wrong if they gained the impression that the idea was to make the study of medicine easier rather than otherwise. It can never be made easy. But it can be made more reasonable, more adapted to stimulate rather than instil, more likely to bring out the best in a man rather than put the most into him.

The published report of this Conference should be one of the most unusual books in the history of medical teaching.

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#### NOVA SCOTIA DIVISION CENTENNARY

In this year, when the old port of Halifax celebrates its 204th birthday, the Nova Scotia Division of the Canadian Medical Association is celebrating its Centennary. It is not easy for organizations to reach maturity. All must go through the stages of learning to walk, meeting the hazards of early childhood and suffering the pangs of growing up. Many, as they grow, develop the necessary self-confidence and judgment to make a real place for themselves in the world. Anyone who is acquainted with the history and development of this Division which has meant so much to the medical profession of its Prov-

ince, as outlined in Dr. Scammel's article on page 349, will appreciate this great achievement.

Haegerty tells us that the Medical Society of Halifax, the forerunner of the Provincial Society and among the first medical organizations in Canada, was founded in 1844. The medical practitioners of Halifax met that year to consider a letter from Major Hugh Bell relative to a proposal for the exhumation of the bodies then interred in St. Paul's cemetery. Apparently he feared that such removal might spread a pestilence in the City.

In the next few years the problem of improving medical legislation for the control of unqualified practitioners, who appeared in alarming number, was frequently discussed. Finally the Society appointed a committee to study the problem of medical practice in the Province. This Committee met on March 15, 1854, in Halifax and resolved to proceed with the formation of a provincial association. A circular was sent out to all practitioners in the Province regarding an annual meeting to be held on October 5, 1854.

The first annual meeting of the new Society met in the Revenue Office in the Province Building at 10 a.m. Unfortunately several physicians were unable to gain admission, owing to the fact that the industrial exhibition of 1854 was opened in the same building. The meeting was therefore adjourned until 3 p.m., when it was held at the office of Dr. Allen on Hollis Street. Twelve physicians were in attendance and the following were elected as first officers of the Society:

President—Hon. W. Grigor, Halifax; Vice-president—Dr. W. B. Almon, Halifax; Vice-president—Dr. W. H. McDonald, Antigonish; Secretary—Dr. J. R. DeWolfe, Halifax; Treasurer—Dr. D. McN. Parker, Halifax.

At this meeting a memorandum was drawn up for presentation to the Legislature and the Act of 1856 was introduced by Dr. W. B. Webster of Kentville. Attendance at this meeting was quite remarkable considering the facilities for travel that were, or rather were not available. There was no railroad in Nova Scotia, no local steamships, and the carriage roads were only "fair to middling".

During the period since the inception of this Society great discoveries have been made and the medical profession has become richer in knowledge and stronger in the means of combating diseases. Nevertheless Dr. L. R. Morse of Lawrencetown, N.S., expressed our sentiments



most eloquently when he said at the 75th Annual Meeting of the Medical Society of Nova Scotia on October 17, 1928: "... times have changed, conditions of practice have altered and are altering rapidly, but when such a celebration takes us back to your simpler days and ways, we find that the ideals which influenced them are ours today, ideals which are ever old, yet always fresh and new."

Yes, October 6 to 9 will be memorable dates for all members of the Nova Scotia Division of the Canadian Medical Association. This meeting, we hope, will be one of the best of the Society's history and, in one respect, will go down as a history maker in our annals. For the first time a Centennary will be celebrated. May there be many more of them!

A. H. Neufeld

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#### DIAGNOSIS IN GENERAL PRACTICE

Diagnosis to the general practitioner means an appreciation of the pathological process, a knowledge of the environmental stress to which the patient may be exposed and an assessment of his personality. In order to accomplish this adequately the general practitioner must be, as so aptly stated by Dr. J. D. Simpson (*Proc. Roy. Soc. Med.*, 6: 353, 1953), first a diagnostician who can make a primary diagnosis with the aid of the history and his own clinical examination and without the use of ancillary aids; second, he must know how and where his diagnosis can be confirmed or disproved and how to initiate specialized treatment, if required; third, he must be skilled in prolonged therapy—pharmacological, psychological and occupational—and be able to continue work that specialized experts have started; fourth, he must adequately understand the patient's environment, work, home surroundings, family and his emotional life.

Disease is the reaction of some pathological and/or physiological or psychological stress on the personality of the individual. Therefore, all these factors must be appreciated and assessed before an adequate diagnosis can be made. Obviously, if the pathological process is a neoplasm, the other two factors will be relatively unimportant. On the other hand, if there is a psychosomatic disorder, the stress and the personality are most important. There is an infinite grading between these two extremes.

Generally, patients fall into four groups: (1) the old patient with the old disease; (2) the old patient with the new disease; (3) the new patient with the old disease and (4) the new patient with the new disease. In the first two groups it is so easy to be lulled into a sense of false security. We know all about the patient, but there is grave risk of missing some disease that has been present all the time or has developed insidiously and masked by the familiar cough, backache, or what have you. Infinite care to assure that no sign or symptom is missed is all important.

The third group might well be described as the old patient with the new doctor. Here it is advisable to proceed with great caution. We must satisfy ourselves that no immediate medical urgency exists. In having eliminated an emergency, it is probably wise to await or request advice from the previous doctor. With a little patience we can avoid a whole series of unnecessary investigations.

In the fourth group all the factors are unknown, whereas the diagnosis must be made as quickly as possible. Information on the prevalence of epidemic diseases, occupational hazards and readiness to appreciate clues of any sort can be most helpful. A consultation for a trivial condition may be an excuse to come to a doctor to discuss a more serious psychiatric or psychoneurotic problem.

Adequate medicine demands confirmation of the original diagnosis. In general practice the therapeutic test is one very important method. The exhibition of a specific drug which cures the disease confirms the diagnosis. Thus *B. coli* cystitis is usually controlled by the sulphonamides. If it is not, an underlying disease of the kidney or bladder should be suspected. Fortunately, facilities for laboratory and radiological confirmation of diagnosis are becoming more easily available to the general practitioner in most parts of the country.

The ability of the general practitioner to make a diagnosis and have it confirmed is particularly important in patients suffering from functional disease. If he makes a firm diagnosis which is proven by hospital investigation and consultation, the patient is well on the road to rational therapy. On the other hand, with a doubtful diagnosis in the early stages, it is not likely that consultant opinion will ever really remove it from the patient's mind.

A.H.N.

## Editorial Comments

### THE 19TH INTERNATIONAL PHYSIOLOGICAL CONGRESS

Montreal, more specifically McGill University and the University of Montreal were hosts this September to the 19th International Physiological Congress. There were more than 2,000 delegates from 48 countries. More than 700 scientific papers were presented during the four days of scientific sessions. Seventeen sessions were going at once at McGill University, plus a symposium mornings and afternoons at the University of Montreal.

There was also the lighter side of the Congress. The City of Montreal gave a buffet supper and dance at the Chalet on beautiful Mount Royal. A reception and buffet supper by the Province of Quebec was given at Stuart Forbes Field. Then there were excursions, sight-seeing tours, as well as the many entertainments in private homes. All told the local organizing committee had done a splendid job.

The organization work of this Congress had been done by a permanent international committee. Much of the work of preparing for the Congress, however, had been carried out by the host organization, the Canadian Physiological Society.

The day after the Congress, McGill University was host to a one day meeting of more than 600 pharmacologists from 30 countries. Two main themes were studied: the influence of drugs on the nervous system, and the action of drugs on kidney functions. In each case, five outstanding scientists presented papers outlining their particular interests of the subject.

One of the striking features of the development of science in the past has been the extent of the interchange of information among men working in similar fields in all countries. Universality is the essence of scientific truth. Much of the rapidity of growth and the vigour of science has resulted from a free interchange of information such as we witnessed in Montreal.

A.H.N.

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### CONSENT FOR SURGERY ON SERVICE PERSONNEL

In civilian medical practice we are all quite familiar with the requirement for parents' consent for any surgical procedures that are to be performed on a person under the age of 21. In order to secure an opinion in regard to parents' consent where it concerns Service personnel under the age of 21, Air Commodore A. A. G. Corbet, Chairman, advises that the Inter-Service

Medical Committee of the Department of National Defence referred this problem to the Deputy Minister of Justice.

The Deputy Minister of Justice has expressed the opinion that the consent of the infant is sufficient to authorize the operation and to relieve a doctor of any liability for assault. At common law once an infant has been enrolled in the Armed Forces he ceases to be under the control or authority of his parents. It follows that if he is properly enrolled in the Canadian Armed Forces so as to become a member of those forces, he has ceased to be under the control of his parents and may, himself, give an effective consent to an operation.

It has been the experience of the Department of National Defence that all civilian doctors do not accept this opinion—or are not aware of it—and will not perform surgical procedures on such Service personnel without first obtaining the parents' consent. For this reason the Inter-Service Medical Committee has asked that this opinion of the Deputy Minister of Justice be brought to the attention of all doctors and hospitals.

A.H.N.

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### BRUCELLOSIS

Very appreciable progress has been made during recent years in the study of the epidemiology, diagnosis and prevention of brucellosis. These advances are described and discussed in the second report of the Joint FAO/WHO Expert Committee on Brucellosis (No. 67 in the Technical Report Series, WHO). Bovine brucellosis, against which efforts have so far been concentrated, is not the only form of the disease dangerous to man. Brucellosis of goats and of sheep remains a big problem. The possibility of applying to sheep and goats the diagnostic tests used for cattle is discussed.

The clinical features of human brucellosis are adequately described in the literature. The two common forms of the disease are, (1) an acute fever of limited duration followed by apparent recovery and (2) the long-continued disease with periodic exacerbations. The onset may, however, be insidious, followed by long-continued disease. Infection may persist in the body for long periods without causing clinical manifestations.

There are no criteria, with the exception of the culture of the organism, which will determine with absolute certainty the existence of *Brucella* infection. The organism can most easily be isolated from blood and bone-marrow. If unsuccessful, the attempts should be repeated, and other sources such as lymph-nodes, C.S.F., urine and any abscesses which may be present should be investigated.



A correct sero-agglutination test almost always gives significantly positive results in the presence of active infection. Repeated tests should be carried out in cases giving low titres or negative reactions before regarding brucellosis as unlikely. While high titres indicate a high probability of infection, this does not exclude the possibility of infection in cases with low or no demonstrable titre. Where antibiotics are freely used in febrile conditions, positive diagnosis by hæmoculture is less frequently possible, and increasing reliance must therefore be placed on the results of agglutination tests.

A positive intradermal test denotes a specific allergic condition and should be regarded as free from other diagnostic significance. It certainly does not prove the presence of an active infection. Its chief value is for epidemiological purposes. A normal, total, white-cell-count or a leukopenia with, or without, a relative lymphocytosis in a febrile patient should suggest the possible presence of *Brucella* infection and should lead to the carrying out of other diagnostic tests.

Although the antibiotics available at the present time mark great advances in the treatment of *Brucella* infection, they do not furnish a complete solution of the problem. Relapses have been observed following the use of each antibiotic singly or in combination. Penicillin is of no value, while streptomycin and dihydrostreptomycin are of no value when used alone. Aureomycin is of value when used alone and a suggested schedule for adults is 2 g. daily for 14 to 21 days. Oxytetracycline (Terramycin) when used alone is comparable in every way to aureomycin. Chloramphenicol has been shown to be of value in the treatment of brucellosis, but caution is advised because of the occasional occurrence of aplastic anaemia following its use. The sulphonamide compounds are of very limited value when used alone.

The simultaneous administration of streptomycin or dihydrostreptomycin with sulphadiazine is of value (1 to 2 g. streptomycin or dihydrostreptomycin and 4 to 6 g. sulphadiazine for 14 to 21 days). Streptomycin or dihydrostreptomycin with aureomycin or oxytetracycline is superior therapeutically to the preceding treatment. The recommended daily dosage is 1 to 2 g. of streptomycin or dihydrostreptomycin combined with 2 g. aureomycin or oxytetracycline for 21 days. The addition of sulphonamide to the two antibiotics in the previous treatment has given good results. Some workers keep the dose of antibiotics as stated, while others prefer to reduce this dose somewhat.

There is no general agreement as to the place to which *Brucella* vaccine therapy is entitled in the treatment of the disease. Some clinicians claim that benefit results from such therapy, particularly in the more chronic forms of the disease with complications. The information

available is insufficient to justify the recommendation of any particular antigen.

In view of the self-limiting nature of brucellosis, the effectiveness of any form of therapy should be judged by the following criteria: (1) immediate and continued clinical improvement in the patient's condition; (2) the disappearance of *Brucella* from the blood-stream and other tissues; (3) the reduction in the incidence of complications; and (4) the reduction in the frequency of relapses, the majority of which occur within six months.

A.H.N.

#### CHANGE OF ADDRESS

On September 12, 1953, the Secretarial Offices and Circulation Department of the Association, formerly at 135 St. Clair Avenue West, Toronto 5, moved to: 244 St. George Street, Toronto 5, Ontario.

The Editorial Offices of the Association remain at 3640 University Street, Montreal 2, Quebec.

### Men and Books

#### DR. WILLIAM PAINE— LOYALIST

A. F. CHAISSON, M.D., *Fredericton, N.B.*

THE NAME of this prominent loyalist physician heads the list of citizens who petitioned the Governor-in-Council for the establishment of an institution of higher learning in New Brunswick in 1785. Associated with Dr. Paine were such leaders as Ward Chipman who later took a prominent part in the growth of the Province, and who has been given the lion's share of the credit for the birth of the present University of New Brunswick. The only practical result of this early petition was the granting of lands for the proposed academy, but that was at least a beginning, and the fact that Dr. Paine's name heads the list of signatories is thought to indicate pre-eminent energy on his part in achieving action. This opinion was expressed by Mr. G. Alvah Good who delivered a very detailed paper on the life and times of Dr. Paine before the York-Sunbury Historical Society recently.

The background of this first signer of the petition for an institution to take the place with the loyalists of Harvard College (their alma mater in many cases) is quite interesting. Himself a graduate of Harvard College, he had studied medicine with Dr. Edward A. Holyoke of

Salem, Mass. and in 1772 was practising his profession in Worcester. The Revolution having broken out while he was on a trip to England, he found himself denounced as an absentee and loyalist upon his return. This decided him to study medicine abroad, and after a year of further work, he obtained his M.D. degree from Marischal College, Aberdeen, and was then appointed official apothecary to the English forces in North America. With the reduction of the forces in 1783, he was discharged at Halifax on half pay and subsequently moved to Saint John and practised his profession there.

He held many offices. These included member and first Clerk of the first Provincial Assembly of New Brunswick; Principal Deputy Surveyor of Woods; Justice of the County of Sunbury and Warden of Trinity Church, Saint John.

The act of banishment was repealed in the summer of 1787. Dr. Paine did not remain in New Brunswick but returned to Worcester, Mass. in 1793 and continued to live in the family mansion there until his death. He was prominent in his profession and became a Member of the Massachusetts Medical Society; the American Academy of Arts and Sciences and the Essex Historical Society. He was also a member of the Royal Society of Northern Antiquities, Copenhagen, and the American Antiquarian Society.

Dr. Paine drew half-pay from the British Government and presumably retained his reserve army status until the outbreak of the war of 1812. At that time, he resigned from the British forces and petitioned Congress for naturalization, which was granted.

It is impossible in the course of this short review to do full justice to Mr. Good's detailed paper dealing with this versatile and interesting physician. His old home in Worcester, Mass. is little changed and for many years enjoyed more than a local reputation among nature lovers, because of its large and beautiful gardens. It has now passed out of the hands of the Paine descendants and is owned by the Daughters of the American Revolution, who care for it and hold their monthly meetings there. Whether or not Dr. Paine would have approved of this, it is impossible to say. He lived in troubled times and his biographer has to leave it to our imagination where lay the doctor's heart.

## CORRESPONDENCE

### SEVENTH INTERNATIONAL CONGRESS OF RADIOLOGY

#### *To the Editor:*

The Seventh International Congress of Radiology was held in Copenhagen, Denmark from July 19, to July 24, 1953. Approximately 3,000 radiologists from fifty countries gathered in Copenhagen to a very excellent scientific program. There was a large commercial exhibit

which included x-ray equipment from a great many countries. At the general sessions the papers were made available in English, French or German by means of individual shortwave radio sets. The Social Program was excellent and all those who attended were much impressed with the charm of Copenhagen, the kindness and courtesy of the Danish people, and last but not least the excellence of the Danish cooking.

Following the Congress many of the radiologists journeyed into Norway and Sweden to visit the many excellent x-ray departments in these countries.

The number of radiologists attending from Canada was small. A great many of those who did go were representing Government Agencies or Provincial Cancer Clinics. The small attendance can be attributed directly to the government policy of not permitting attendance at such a scientific meeting as an income tax deduction. Insofar as it is possible to determine it appears that Canada is the only country of the world where this condition exists. It is most regrettable that Canadian doctors are being prevented from attending these world congresses to improve their scientific knowledge and also to tell the world of what Canada is doing in medicine. When a doctor leaves his practise, his income ceases and when the cost of attendance at these conventions must be paid out of taxed income, the situation becomes impossible in many cases.

CHARLES E. VAUGHAN.  
Hamilton, Ont.

## THOUGHTS ON STATE MEDICINE

#### *To the Editor:*

From the different approaches taken by Candidates of the several Parties offering their administrative wares, one common article of sale has been State (or National) Medicine, in a decisive though usually nebulous shape. It may therefore be of interest to know something of the little exposed advantages and disadvantages of the considerable change which planted itself with firmness, but doubtful husbandry in the clinical garden of the United Kingdom. At the time of this activity I was Medical Director General, Royal Air Force and, although this appointment would appear to have little connection with civilian functions, it became sufficiently associated to provide a study of considerable interest.

The birth of the National Medical Service occurred during the time when a Labour Government sat in control in Westminster. It was my good fortune to meet several of the Labour members in different duties and in varied situations. The barrier, in the United Kingdom, between one or other political party, so far as concerns the application of medicine in general is really a very slender one, which, under appropriate circumstances can be readily crossed. I have never believed it right that the maintenance of health and the treatment of those who are ill, should be made an issue from any platform. It is a common endeavour in which *all should offer their highest capacities*. It was actually a coincidence that the National Health Service came into being with a Labour Government in power. It was essential under any circumstance. Where the weaknesses in its structure lay was that it was rushed rather blindly towards a false dawn. When such a problem is precipitated thus, it is inevitable that many fine chances of doing good work are lost, sometimes beyond recovery.

*The Service was good*, because its need was apparent. Under the previous system there was an endless uphill and losing struggle against debt. Voluntary hospitals were in many cases sadly in debt to banks and other bodies. It was wonderful while it lasted. I do not believe that the human touch of the past will ever be known quite that way again. Too little has been written on the hard work and the sacrifice which was so evident by all who worked in those hospitals.

*The Service was good*, because it removed the fear of illness as a handicap to many whose incomes fitted hazardously into the *personally responsible group*, so that lengthy illnesses meant no holidays and numerous



other retrenchments as well. The "free wards" were jealously guarded for those who very clearly could not face expense, while the small and middle incomes suffered. The Lloyd George Panel System had a limited range of application among the small income groups. Other alternatives came into being, but the situation only grew more complex. The basic issue was—"some organization must take over the considerable expense of running the hospitals and maintaining, through research, a steady advance along the road to the eradication of disease".

*It was defective* as a Service, primarily because it was put into function too quickly. There was still time to spare which should have been given to carefully planned and controlled experiment—experiment in hospital design, experiment in cost, experiment in staffing and the method by which promotion could be fairly and efficiently carried out, experiment relating to doctor requirements so that over-establishment could be prevented. If a large city had been made the centre of study to cover eventually all large cities, and areas—urban and rural—had similarly been treated, a splendid overall structure would have eventuated and become a recognized pattern far outside the shores of the British Isles. For reasons as yet not clearly defined, the problem of medical administration became the sport of laymen. It would be interesting to see the reaction of laymen if doctors undertook the administration of the steel industry or the insurance world. Probably in all this the sad factor is that laymen as a whole, engaged in "big business", can only measure the "material" aspect of the subject, completely missing the "ideal" without which, the body not only perished but the soul with it.

*It was defective* as a Service in many other ways. For instance, no sooner were free spectacles available than 4,200,000 pairs were ordered. The factories were blocked, the work of those responsible for the clinical side deteriorated and, in the end, many such glasses found their way into the "pawn shops" as they carried a little value. To many of the public it was "something for nothing" and this application was common to drugs, dressings and all appliances that could be carried away from surgery or chemist.

*It was defective* because it "cost nothing" in spite of the annual levy per individual. So, crowds filled the doctors' waiting rooms and the doctor became a form of medical clerk. The hospitals tended to be blocked with the long term case.

*It was defective* because, in consequence of the above result, young doctors crowded the examination halls so as to pass out of the humdrum into the utopia of specialization. The result was over production of specialists—often without credentials beyond their academic prowess and more often without any appointments measurable against their higher degrees. So there developed a clinicians "dole", a form of "unemployed list". I met a man holding the M.R.C.P.(Lond.), who was in receipt of *unemployed benefit*. I heard of an appointment, open in the Midlands of England, not a very glorious one, for which 171 men applied all holding "consultant qualifications F.R.C.S. or M.S." Such a situation was not unique.

Careful planning, with the medical profession well to the fore, could have prevented very much of this and brought a fine system into being.

In the words of Omar:

"The moving finger writes, and, having writ  
Moves on. Nor all your piety nor wit  
Shall lure it back to cancel half a line  
Nor all your tears wash out a word of it."

When a great, highly complex, and costly organization dealing with the human factor from many aspects becomes, in part at least, a matter of political expediency, the result in the first instance is not difficult to forecast. One of the outcomes of much interest probably not appreciated at the beginning was the remarkable impetus given to medical research and to training in its higher applications.

In what manner could this costly, hastily constructed, though basically just, system of National Health have an effect upon the trend of medical thought in Canada?

*Firstly*, it should awaken the profession to the urgency of its full participation in the development of the scheme.

*Secondly* it should expose a clear risk, namely the scramble for appointments, not in every instance by suitable persons.

*Thirdly* it should stress the immense importance of remembering the aged and infirm so that proper arrangements for their care will not embarrass the active hospital bed state.

*Fourthly* it should emphasize the danger of haste in putting measures into full and widespread effect and the value of local experiment as an intermediate phase.

Duncan, SIR PHILIP LIVINGSTON, K.B.E., C.B.,  
Vancouver Island A.F.C., F.R.C.S.(Eng.)  
(Air Marshal, R.A.F. Retired)

## SPECIAL CORRESPONDENCE

### *The London Letter*

(From our own correspondent)

#### BLOOD TRANSFUSION ACCIDENTS

In a statement on blood transfusion accidents, the Consulting Pathologists Group Committee of the British Medical Association expresses the opinion that it is "regrettable that a large newspaper-reading population should be introduced to the subject of blood transfusion by headlines that high-light almost every fatality. The incidence of such fatal cases is thus grossly exaggerated and needless alarm thus spread". It admits, however, that the true incidence of such fatalities for the whole country is not known, but quotes "one large hospital in the London area" where the incidence has been "of the order of one death in a period of six years, in which 13,000 bottles were transfused". On the other hand, it is agreed that there is risk attached to transfusion, which is said to be comparable to that attached to uncomplicated appendicectomy: therefore, "similar consideration should be given to, and plans made for, a blood transfusion as would be given to the question of opening an abdomen for appendicectomy". On the question of unnecessary transfusions the statement is equally cautious: "there is an increasing demand for blood which tends more and more to exceed the supply; this suggests that there may be a certain measure of over-prescribing, which adds to the risks undergone by some patients and acts to the detriment of others who are really ill and require a life-saving transfusion. . . . Thus it appears unjustifiable to place any patient at risk for one pint of blood; such cases would do well with a plasma substitute, because only blood volume can be involved when the loss is so small. In healthy young women with slight loss of blood from abortion, miscarriage, or at term the natural recuperative powers must neither be forgotten nor superseded".

Having thus dismissed in a somewhat cavalier manner some of the aspects of blood transfusion which are causing concern to clinicians in general, and to the Medical Defence Unions in particular, the statement then proceeds to a masterly summary of the technique of managing a hospital blood bank and giving transfusions.

#### SHOULD HOSPITAL NURSES LIVE IN?

The Minister of Health has accepted the advice of his Standing Nursing Advisory Committee that, with

certain exceptions, "there are no factors inherent in the work of a hospital nurse that make it necessary that she should live in the hospital in which she works, or in nearby accommodation provided by the hospital". The exceptions include matrons, theatre staff in hospitals too small to arrange a night rotation for emergency calls, sisters in charge of acute wards, and student nurses (especially during their first year). Advantages claimed for living out include the greater sense of independence which it allows to nurses, and a closer contact with the outside world, with consequent insight into the problems of patients. Hospital authorities are asked to consider the possibilities of acquiring large houses which can be converted into flats, or let in single rooms, the staff to make their own arrangements for catering, cooking and communal services. An alternative suggestion is the maintenance of a register of approved lodgings for nurses. Hospitals are also advised to consider the advantages of recruiting more staff from the immediate neighbourhood, so that the girls can live at home during their training. Theoretically, this may all be very nice in the name of "freedom" and "emancipation", but it has its practical disadvantages to which attention is already being drawn. Provided the Minister's recommendations are adopted with discrimination, all will be well; otherwise hospitals may run into more difficulties and more financial complications than they are encountering at the moment.

#### HEROIN DEFENDED

In a letter to the *British Medical Journal*, Dr. A. H. Douthwaite, senior physician to Guy's Hospital, protests against the suggestion that the use of heroin should be made illegal in this country. He contests the opinion that heroin can be satisfactorily replaced by other drugs. The incidence of vomiting from morphine is high, amide and pethidine are by no means reliable substitutes, and pethidine vomiting can be troublesome. "Are we to suffer our patients to vomit for the sake of potential addicts?" he asks. "As for the suppression of cough, it is true that in adequate doses codeine will be effective, only too often, however, with the addition of severe constipation, lethargy and depression". To the argument that heroin should be banned in this country because it is a widespread drug of addiction in countries such as Egypt, he replies: "By and large it may be accepted that widespread drug addiction is the outcome of poverty, ill-health and misery, and it is to the remedy of these conditions rather than interference with therapeutics that governments should direct their energy and money". So far as this country is concerned, "the laws governing the use of dangerous drugs are very strict, and rightly so. Let us then not give countenance to remote control by an organization detached from the day-to-day problems presented by the sick and suffering". This protest against the banning of heroin represents a view which is quite widely held by clinicians over here.

#### REINFORCED FLOUR

Although we have had whiter flour since August 30, when the control of flour ended, its nutritional value is to be maintained—thus making the best of both the æsthetic and the nutritional worlds. This is being achieved by a Ministry of Food order whereby calcium is to be added to all kinds of flour except "true wholemeal flour", to which nothing is to be added. National bread made of flour of 80% extraction continues to be subsidized, and it is to be on sale wherever whiter bread is sold. Millers, however, are free to mill flour at whatever extraction rate they like, but vitamin B<sub>1</sub>, nicotinic acid and iron have to be added to all flours of a lower extraction rate than 80%.

London,  
September, 1953.

WILLIAM A. R. THOMSON

## OBITUARIES

DR. JOHN BEATON of Miramichi, N.B., died in the Miramichi Hospital at Newcastle, N.B. on July 26 at the age of 65. Dr. Beaton had been vacationing at Kouchibouguac when he was suddenly stricken and rushed to hospital. He had been practising medicine for many years in the Blackville district and word of his death was learned with deep sorrow by hundreds in this area who knew Dr. Beaton as a friend and physician.

Born in Cape Breton, he completed his medical studies at Dalhousie University, and McGill University. He went to Blackville to practice in 1912 and remained in that community ever since. Surviving are his widow and one son.

DR. GEORGE ARLINGTON BENNET died on July 26 in Halifax, N.S. in his 89th year after a lingering illness. In 1895 Dr. Bennet graduated in medicine from Long Island Medical College, Brooklyn, N.Y., then took his internship at that college hospital, specializing in cardiology. His previous education was received at Dalhousie College, Halifax. Apart from his medical interests he was an accomplished organist and contributed valued services in his home community.

DR ADRIEN BRUNET, chef du laboratoire de l'hôpital Notre-Dame de l'Espérance à ville S.-Laurent, est décédé le 28 juillet, à l'âge de 50 ans. Il est un ancien élève du collège S.-Laurent et fut diplômé de la faculté de médecine de l'Université de Montréal en 1930. Il était aussi stagiaire des hôpitaux de Paris; et directeur-fondateur de l'Harmonie de ville S.-Laurent.

La mort subite du Dr Adrien Brunet prive le monde médical d'un de ses figures les plus marquantes. Il laisse, outre son épouse, cinq filles et deux fils.

DR. R. A. CLAASSEN, aged 59, Winnipeg physician for over 25 years, died on August 8. Born in Samara, Russia, Dr. Claassen graduated in medicine from the University of Emperor Nicholas in Saratov, Russia, 1916. During the First World War he served in the Russian Army as a medical officer. Dr. Claassen took postgraduate studies at Metchnikoff Institute in Moscow for three years. In 1925 he came to Winnipeg and practised his profession until his death. He was a member of Winnipeg Mennonite Mission Church. He is survived by his widow, a daughter, and a son.

DR. ISOBEL T. DAY died on August 5 at Vancouver, where she had been on the staff of the General Hospital. During World War I, she served in England and France, and was decorated by King George V with the Royal Red Cross. In World War II, Dr. Day was a commissioner in St. John Ambulance Brigade. She was a silver medalist graduate in medicine from the University of Toronto, in 1925. Surviving is her husband.

DR. SAMUEL EAGLESON, aged 82, beloved country doctor from the Madoc district north of Belleville, Ont., died on August 3 after 50 years of general practice. He delivered 5,156 babies and never lost a mother in childbirth. In 1899 he graduated from Trinity Medical College with a gold medal, and with a silver medal from Trinity College. He opened his practice in Madoc in 1900, and with the exception of a year's postgraduate work in Edinburgh and London, Madoc was his home for the fruitful years of his long life.

His career took him back and forth across 2,500 square miles of Eastern Ontario, to farm homes, villages and lonely bush camps. Four years ago the people who knew him best gathered to do him honour. After turning his back on city life and the practice of an ear, eye, nose and throat specialist to spend his days ministering to people scattered across many miles of wild country, he continued through reading and study to keep up with the fast-moving developments of medical science.



DR. STANLEY EAMAN died at Queen Elizabeth Hospital, Montreal, on August 4. Dr. Eaman was born and educated in this city, obtaining his B.Sc. and medical degrees at McGill University. He is survived by his widow, and two sons.

DR. HERMAN JOHN FERRIER, radiologist at McKellar General Hospital, Fort William, Ont., for the past 28 years, died on July 15. Dr. Ferrier was 60. Born 1893, at Hartney, Manitoba, he was graduated from the Faculty of Medicine at the University of Manitoba, Winnipeg, in 1920. Dr. Ferrier served overseas during World War I, as a member of the 4th Field Ambulance Brigade. In addition to his duties as radiologist at McKellar Hospital, he was, over a period of years, also in charge of x-ray work at St. Joseph's and the General Hospital in Port Arthur, until shortly after the close of World War II.

In recognition of his services in St. John ambulance work, Dr. Ferrier last year was honoured by the Venerable Order of the Hospital of St. John of Jerusalem with his appointment to the rank of Officer Brother. At the time, Dr. Ferrier had been active in St. John ambulance work for some 27 years and had been district surgeon for several years. He was a member of the Canadian Radiological Society and he was also a member of the American College of Radiologists. Surviving are his widow, two daughters, and a son.

LE DR J.-F.-A. GATIEN, ancien député de Maisonneuve à l'Assemblée législative, est décédé vers la fin de l'après-midi, le 11 août à l'hôpital, à la suite d'une maladie de plusieurs semaines. Il était âgé de 74 ans. Au moment de sa mort, le défunt était curateur public de la province de Québec. Le Dr Gatien qui, depuis près d'un demi-siècle, exerçait sa profession à Maisonneuve, était né à Marieville, comté de Rouville, le 28 février 1879.

Le défunt avait fait ses études classiques au séminaire Ste-Marie de Monnoir pour entrer ensuite à la faculté de médecine de l'Université Laval de Montréal. En 1904, il avait été admis à la pratique de sa profession. Il était allé aussitôt établir ses bureaux de consultations à Labelle où, en société avec le Dr J.-A. Bigonnesse, il avait fait un stage d'un an.

Il était revenu à Montréal en 1905 et s'était fixé définitivement à S.-Clément à Viauville, à Maisonneuve, où depuis plus de 49 ans il avait pratiqué son art. Le Dr Gatien avait été surnommé "le médecin des pauvres". En plus de sa clientèle ordinaire, le Dr Gatien avait été le médecin attitré du Conseil Maisonneuve l'Ordre des Chevaliers de Colomb et de l'Union S.-Joseph du Canada. A sa mort, il était encore membre actif de plusieurs autres sociétés mutuelles et de bienfaisance.

Fondateur et président depuis 1932 de l'Association des médecins de l'Est de Montréal, il avait aussi été président de l'Association des médecins praticiens. Il avait été le premier vice-président du Collège des médecins et chirurgiens de la province de Québec. En janvier 1949, il avait reçu de Sa Sainteté le Pape la Croix de S.-Jean-de-Latran et la médaille de l'ordre des Chevaliers de Ste-Catherine de Sienne. Député de l'Union nationale pour le comté de Maisonneuve de 1944 à 1952, il avait été subséquemment nommé Curateur public de la province de Québec, poste qu'il avait occupé jusqu'à sa mort. Le 26 juin 1906, il avait épousé Albertine Labelle, fille de Camille Labelle, de Montréal; elle l'avait précédé dans la tombe il y a quelques semaines à peine. Le défunt laisse deux fils et trois filles.

DR. JAMES C. GOODWIN died on August 3. He was 50. The senior attending obstetrician and gynaecologist at Toronto General Hospital, Dr. Goodwin had been a teaching associate of the University of Toronto Medical School from his completion of postgraduate work there in 1930. He was a founder of the Society of Obstetricians and Gynaecologists in Canada and was the organization's

first secretary. He was a member of the Academy of Medicine of Toronto, of the O.M.A. and the C.M.A. During the Second World War he was reserve medical officer of the Royal Regiment of Canada.

He was president of the Medical Historical Society of Toronto and his interest in native history extended beyond his profession. He took his Master's degree in anthropology during his first year of teaching. From about 1935 he built a collection of material on the early settlers of Upper Canada, particularly those of the Toronto and Niagara district, until before his death he was considered a leading authority on Canadiana. He specialized in postal history and his collection of Canadian postal history was considered to be one of the best in the world. He was one of the founders of the Postal History Society of the Americas, president of the Canadian Society of Philatelic Exhibitors, and associated with many other societies.

Dr. Goodwin was educated in New York State, Pennsylvania and Oregon and at Niagara Falls Stamford Collegiate. He graduated in medicine from the University of Toronto in 1926. He leaves his widow, two sons, and a daughter.

DR. NORMAN MacLEOD HARRIS, former Chief, Laboratory of Hygiene, Department of Pensions and National Health, Ottawa, died on July 24. He was in his 84th year. He was a former president of the University Club of Ottawa and a charter member and former president of the Society of American Bacteriologists. Dr. Harris was born in Montreal. He was an M.B. University of Toronto in 1894 and the year following became an M.R.C.S.(Eng.) and L.R.C.P.(Lond.).

From 1897 to 1903 he was Associate in Bacteriology, University of Toronto. In 1901 he became Instructor and Associate in Bacteriology, Johns Hopkins University being associated with Dr. Osler, Dr. Welch and Dr. S. Flexner. He had studied for a time in Germany at the University of Berlin, and in the private laboratories of Dr. Jorgensen, Copenhagen. From 1903 to 1919 he was Instructor and Assistant Professor of Hygiene and Bacteriology at the University of Chicago. He saw service in World War I as Officer Commanding Sanitary Section No. 4 (France and Belgium). Following World War I he followed studies at University College, London, and at the University of Glasgow, Faculty of Medicine. From 1921 to 1928 he was Chief of the Laboratory of Hygiene, Department of Pensions and National Health, retired from that post in 1938. In 1928 he was elected vice-president of the American Health Association and the following year became president of the Canadian Health Association. In 1952 he was made an honorary member of the Canadian Society of Microbiologists.

DR. W. L. HIGGINSON of Pembroke, Ont., died suddenly on August 9. He was 57 years of age. He was born in Inkerman, and educated in local schools. In 1918 Dr. Higginson graduated from Queen's University, and interned at St. Luke's Hospital in Ottawa. He then practised for a short time at Lachute, Que., Westmeath and Cobden, before settling in Pembroke in 1927. He is survived by his widow, and a daughter.

DR. HAROLD J. MACK of Cornwall, Ont., died suddenly at Montreal Neurological Institute on July 17. He was 60 years of age. Dr. Mack was born in Cornwall. He was educated at Cornwall public and high schools and was graduated from the faculty of medicine of McGill University in 1916. During the First World War he served overseas four years with the First McGill Hospital Unit. He started his medical practice in Cornwall in 1920. He carried on active practice until one month before his death and was a member of the medical staffs of the Cornwall General and Hotel Dieu Hospitals.

He served as chief of staff at the General in 1930 and 1951. Dr. Mack served for several years on Cornwall Public School Board. He is survived, in addition to his widow, by one son, and one daughter.

LE DR GEORGES MANSEAU, professeur d'anatomie pathologique à l'Université de Montréal et directeur des laboratoires de l'Hôpital Sacré-Cœur de Cartierville, est décédé le 22 Juillet au Pavillon Noailles de l'hôpital Notre-Dame-de-L'Espérance, à l'âge de 48 ans. Le Dr Manseau était également directeur des exhibits scientifiques de l'Association des médecins de langue française du Canada depuis 1936 et membre du bureau médical et pathologiste du Sanatorium St. Joseph de Rosemont et de l'Institut Lavoisier. En 1948, il avait pris avec le Père Hector Bertrand, S.J., l'initiative du premier congrès du Conseil des hôpitaux catholiques de la province tenu à Québec. Il a fait ses études classiques au Collège de Montréal et a étudié la médecine à l'Université de Montréal. Il a fait une année d'études supplémentaires à Paris et à Marseille. Il laisse dans le deuil, outre son épouse, trois filles.

DR. THOMAS ARNOLD McCORMICK, of Windsor, Ont., died on July 18 following a brief illness. He was 82. Dr. McCormick maintained an active practice until very recently, when ill health forced him to rest. Born in Harrow, Dr. McCormick attended Potley public school, Essex high school and the Windsor Model School. For several years he taught in schools throughout Essex County. He graduated in medicine from Trinity Medical College, a few years before its amalgamation with the University of Toronto.

Dr. McCormick practised medicine in Wheatley for seven years following his graduation and then he went abroad for a year for postgraduate study in London, England. Upon his return, he went to Detroit, where he practised medicine for several months and then returned and lived in the old town of Walkerville for the past 49 years. He was a charter member of the Essex County Medical Society and served two terms as medical officer of health for Walkerville between 1910 and 1915. Surviving is his widow and one son, Dr. Norman Arnold McCormick, of Windsor.

DR. THOMAS HENRY ORTON, aged 90, medical officer of health in Guelph, Ont. for 17 years before his retirement in 1939, died in Toronto recently. Born in Ancaster, where his father had been a doctor, he was a graduate of McGill University, and first practised in Mount Forest. Dr. Orton was a member of the Zeta Psi fraternity, a Mason, and a member of the Sons of England, being lodge doctor for the Sons and Daughters of England in Guelph. His widow, one son, Dr. Thomas H. Orton, of Oshawa, and two daughters, survive.

DR. HERMANN MELCHIOR ROBERTSON, physician and surgeon in Victoria, B.C. for over 50 years died on July 19, after a lengthy illness. Dr. Robertson was a native son, born in 1876. Dr. Robertson graduated in medicine from McGill University in 1898. After he was graduated he came home to Victoria to hang out his shingle. In 1910 he went to Europe to study further in medicine. He received his F.R.C.S. from Edinburgh and his M.R.C.S. and his L.R.C.P. in London. He served as a colonel in the First World War in the Medical Corps at Salonika. Before that he was a member of the famous 5th Regiment with Sir Arthur Currie.

It was three years ago that the 76-year-old doctor retired from active practice. Just last June the Canadian Medical Association had honoured Dr. Robertson by giving him a senior membership. He was president of the Association at its Victoria convention in 1936. He is survived by his widow.

DR. THOMAS A. SINCLAIR of Walkerton, Ont. died at the Bruce County Hospital on July 12. He was 71. Born in Walkerton Dr. Sinclair attended the local public and high schools and after graduating, attended model school here, receiving his teachers' certificate. For a time he taught at Maple Hill and afterwards went to Durham. Later he attended the University of Toronto and received the degrees of B.A., M.A., and M.B. He then was awarded a diploma which permitted him to practise medicine in the State of Pennsylvania, and a short time afterwards received his Ph.D. degree from the Temple Bar College at Missoula, Montana.

When his educational ambitions were completed Dr. Sinclair practised for a time at Timmins and at Christian Island. He had practised in Walkerton for 26 years.

DR. HARRY SMITH of Port Dover, Ont., died on July 24. Dr. Smith was born here 72 years ago. He attended school in Port Dover and graduated in medicine at the University of Toronto. He practised medicine in Orillia for many years, retiring four years ago, and coming to Port Dover.

DR. REX YOUNGE of Ponoka, Alta., died with sudden heart seizure at his summer cottage at Gull Lake on July 7. He was 44. Born in Denmark. Dr. Younge graduated in medicine from Alberta University in 1939, practised at Westlock Legal health unit and Prince Alberta before coming to Ponoka in 1945. Interested in community life here, he was a member of the Kinsmen's Club and Elks lodge. Surviving are his widow; two sons; and two daughters.

## ABSTRACTS *from current literature*

### MEDICINE

#### *Management of Bleeding from the Upper Gastrointestinal Tract.*

HOERR, S. A.: NEW ENGLAND J. MED., 248: 404, 1953.

Peptic ulceration is the cause of upper gastrointestinal bleeding in 75% of cases. Gastritis, oesophageal varices, and gastric neoplasm are next in order of frequency. Conservative therapy, including the liberal use of blood transfusions and a good ulcer regimen, is indicated in the vast majority of cases. Surgery is indicated if such measures do not bring about satisfactory clinical improvement. Accurate, and frequent, clinical assessment of the patient's condition is essential and complicated laboratory investigations are usually unnecessary. Oesophageal varices may be ruled out by oesophagoscopy in the operating room prior to laparotomy and such a procedure may obviate needless surgery. Careful and gentle barium studies of the upper gastrointestinal tract are often indicated, even in the presence of massive bleeding, in an effort to make a definite diagnosis.

Emergency surgery should be considered in patients over the age of fifty, because the bleeding may be coming from arteriosclerotic vessels that cannot easily contract or thrombose; with evidence of massive hæmorrhage where transfusions are not stabilizing the situation; with recurrence of hæmorrhage after a quiescent period; with hæmorrhage exceeding 1,500 c.c. per day, and in cases where bleeding is slow but persistent. If the abdomen is opened and no obvious lesion evident gastroscopy done with a cystoscope through a small opening in the stomach may disclose the cause of the hæmorrhage.

NORMAN S. SKINNER



*Cancer of the Lung in Physicians.*

WYNDER, E. L. AND CORNFIELD, J.: NEW ENGLAND J. MED., 248: 441, 1953.

By means of questionnaires sent to estates information on exposure to possible respiratory irritants was studied in 63 physicians who had died of cancer of the lung and in a control group of 133 physicians whose death had been caused by cancer outside the respiratory tract. A highly significant association between the use of tobacco and the development of pulmonary cancer was evident. The estimated mortality from cancer of the lung rose from 10 per 100,000 among nonsmoking physicians to 133 per 100,000 among physicians smoking 35 or more cigarettes a day. The estimated mortality from pulmonary cancer among physicians who smoked cigars and pipes was above normal but markedly less than that found among cigarette smokers, pipe smoking apparently being the least carcinogenic habit.

NORMAN S. SKINNER

*Epidemic Hepatitis.*

WAHL, P. N. AND ARORA, M. M.: NEW ENGLAND J. MED., 248: 451, 1953.

An epidemic of hepatitis in Uttar Pradesh, India, in 1949 was studied in detail. Of particular interest was the high mortality rate (7.8% among males and 43.2% among females) which was considered to be due to poor nutrition general to the population. The high mortality among females was associated with pregnancy (81%) and two female deaths occurred in patients with a history of amenorrhoea. This suggests that the female sex hormone has a bearing on the course of epidemic hepatitis.

Liver biopsy and autopsy material in this series suggested that when epidemic hepatitis becomes chronic it results in post-necrotic scarring and not in diffuse hepatic fibrosis, cholangiolitis cirrhosis or hypertrophic biliary cirrhosis.

NORMAN S. SKINNER

*Effects of Early Postoperative Ambulation.*

PALUMBO, L. T., et al.: POSTGRAD. MED., 13: 206, 1953.

Early ambulation was proposed by Ries over 50 years ago. Prolonged bed rest causes many undesirable physiological changes, including skeletal and smooth muscle weakness and loss of tone, loss of calcium and nitrogen from the body, reduced vital capacity, decreased cardiac output, slowing of the circulation, and delay in wound healing. Consequently many complications may occur during the postoperative period.

The authors compared the results of two series of patients: late ambulation, patients kept in bed 6 days postoperatively (1,203), and early ambulatory patients, patients up on the second or third day (1,700). In the early ambulatory group there were 40 (2.3%) complications and in the late group there were 69 (5.7%). The most frequent complications were pulmonary and gastrointestinal in type. Pulmonary complications occurred in 1.2% of the early group and in 2.6% of the late group. Ileus developed in 0.07% of the early group as compared to 0.17% of the late group. Acute thrombophlebitis was frequent in both groups—0.3% in the early group and 0.6% in the late group. Catheterization was necessary in 1.3% of the early group and 3.9% of the late group—a significant difference. Wound complications were few in both groups. The incidence of postoperative herniae was not increased by early ambulation, nor was the incidence of recurrence of hernia increased by early ambulation. The period of hospitalization was reduced; the average hospital stay was 14.4 days for the early group and 19.2 days for the late group.

From all aspects early ambulation provides a more rapid rehabilitation of the patient and causes an economic saving to both patient and hospital.

J. A. STEWART DORRANCE

*Short-Term Continuous Transperitoneal Dialysis.*

LEGRAIN, M. AND MERRILL, J. P.: NEW ENGLAND J. MED., 248: 125, 1953.

Peritoneal irrigation is capable of removing large quantities of diffusible substances from the body, the type and amount of which can be regulated by the composition of the irrigating fluid. The procedure is of clinical value in acute renal insufficiency and may prove advantageous in combating the chronic oedema of congestive heart failure and the nephrotic syndrome.

The authors give in detail a method of peritoneal irrigation which can be carried out in any hospital without complicated equipment. In summary a trocar is inserted through the left abdominal wall and a catheter is inserted through it. The dialysing fluid is then run in at the rate of about two litres an hour. At the end of an hour another such catheter is inserted through the right side of the abdomen and the fluid drained through this. As much as 110 gm. of urea has been removed by this method in a twelve-hour period. The authors advocate limiting the dialysis to about a twelve-hour session, but it may be repeated after forty-eight hours. Infection is obviated by the presence of anti-biotics in the fluid.

The authors have carried out five such dialyses in three patients without encountering any significant difficulty.

NORMAN S. SKINNER

## SURGERY

*Nephrectomy and Other Treatment for Hypertension in Pyelonephritis.*

PICKERING, G. W. AND HEPTINSTALL, R. H.: QUART. J. MED., 22: 85, 1953.

The rôle of pyelonephritis in the etiology of hypertension is reviewed by the authors. Chronic pyelonephritis can definitely cause hypertension and, if the pyelonephritis is unilateral, nephrectomy is definitely indicated. Therapeutic failure is probably caused by long-standing hypertension in an irreversible stage or unsuspected chronic pyelonephritis in the remaining kidney.

Intravenous pyelography is indicated in the investigation of patients with hypertension since unilateral pyelonephritis can occur without more than a trace of albumin in the urine and with normal renal function. If unilateral disease is then suggested both ureters should be catheterized, a urea-concentration or similar test done on both sides, and the urine cultured and examined for cells and albumin. If such investigation indicates unilateral disease nephrectomy is justified and may be expected to relieve the hypertension in about half the cases.

Where chronic pyelonephritis is accompanied by severe hypertension not relieved by nephrectomy, or where nephrectomy is contraindicated because both kidneys are affected, the hypertension may be treated by parenteral administration of hexamethonium compounds, subtotal adrenalectomy or sympathectomy.

Material reduction of hypertension was secured by the authors following nephrectomy in four of seven cases with unilateral pyelonephritis.

NORMAN S. SKINNER

*Primary Retroperitoneal Tumours.*

HERDMAN, J. P.: BRIT. J. SURG., 40: 331, 1953.

In a ten year period there were 14 cases of primary retroperitoneal tumours on which autopsies were performed at the Radcliffe Infirmary, Oxford. Ten were females, none were children, but all adult age groups are included. Four were cases of adrenogenito-urinary

origin and histologically appeared as ovarian pseudomucinous cystadenocarcinoma, ovarian pseudomucinous cystadenoma, cystic leiomyosarcoma and solid leiomyosarcoma. There were no teratomas or dermoid cysts or neuroblastomas. Eight were of connective tissue origin: myxoliposarcoma and haemangiopericytoma. The difficulty of differentiating simple lipomata is pointed out. Two were simple cysts.

Differentiation between the groups was not possible clinically. The diagnosis of primary retroperitoneal tumour should not be made without a palpable mass. Excretion pyelography is especially valuable in diagnosis. Excision is the treatment of choice, plus radiotherapy for the more anaplastic neoplasm. Myxoliposarcomata seldom invade so that organs can usually be spared, but they recur even after apparently complete removal and may require repeated excision. Simple cysts do not recur.

BURNS PLEWES

#### *Sitting Down to Surgery.*

SACKS, G.: *Lancet*, 1: 690, 1953.

The practice of surgery is dominated by the patient—his care, his comfort, and his survival. No one bothers too much to consider the care, comfort, or survival of the surgeon. Some suggestions are made to lengthen the surgeon's days and to sweeten the atmosphere in operating theatres.

The greatest need is for the surgeon to be relaxed whilst operating. There is scarcely an operation which cannot be done better with the surgeon sitting down. The ordinary theatre stool does not readily lend itself to a seated position for the surgeon. The one used by the author has a powerful spring for the pedestal portion, so that it accommodates itself somewhat to movement. The Cole-Rous position is adapted in the following manner for upper abdominal operations. With the patient lying on her back, a sandbag 18 in. long and about 6 in. wide is placed under the right side of the thorax so that the torso is tilted to the left, while leaving the pelvis flat on the table. The right arm is brought over so that it hangs over the left shoulder, and the face is turned to the left. The patient lies as close to the left side of the table as possible, and the table is tilted slightly laterally. The surgeon sits on the left side. A cholecystectomy or a gastrectomy performed in this position becomes vastly simplified. In cholecystectomy the gall-bladder, even in difficult circumstances, is comfortably handled, and the common bile-duct is nicely accessible. In gastrectomy the duodenum comes forward admirably, and the surgeon sits with his hands in the correct position to close its cut end. The most difficult case becomes easy. Tying the left gastric artery is enormously simplified. Scarcely ever are retractors called for in either operation. In operations on the descending colon and rectum the surgeon sits on the left and the patient is laterally tilted this time without the use of sandbags.

B. L. FRANK

#### *Slowly Absorbed Tubocurarine Chloride in Orthopaedics.*

LIPOW, E. G.: *ARCH. SURG.*, 66: 312, 1953.

A slowly absorbed intramuscular preparation of curare is being used to control muscle spasm such as occurs in fractures, low back pain and certain shoulder and hip lesions. "Tubadil" alleviates such spasticity for many hours and is free of complications when the dosage is not exceeded. Diplopia and skeletal muscle incoordination are transient. Respiratory arrest did not occur in over 500 doses. It is very helpful in the use of traction and manipulative procedures. The use of long-acting tubocurarine in suitable cases reduces the need for sedatives considerably.

BURNS PLEWES

#### *Microbiologic Flora of Chronic Cutaneous Ulcers.*

VICHER, E. E., SASKA, J. W. AND JACKSON, G. G.: *ARCH. SURG.*, 66: 283, 1953.

A study was made of 63 ulcers over the bony prominences of paraplegics. A total of 1,217 bacterial strains were recovered, mostly Gram-positive. Half the cultures yielded only two strains, 20% showed a single strain. The principal flora were coagulase-positive haemolytic *Staphylococcus aureus*, *Micrococcus proteus* and *Pseudomonas*. *In vitro* sensitivity for penicillin, streptomycin and bacitracin were most effective. But antibiotic treatment should be used on a clinical basis, considering that open ulcers can not be kept free of virulent bacteria for long periods. Intensive periods of treatment for short intervals are centred around surgical intervention or to control extension of the lesions. Resistant flora results from prolonged prophylaxis by antibiotics. The number of penicillin-resistant strains of staphylococci resistant to streptomycin or bacitracin is almost negligible.

BURNS PLEWES

#### *Malignant Cutaneous Melanoma: A Review.*

WRIGHT, R. B., CLARK, D. H. AND MILNE, J. A.: *BRIT. J. SURG.*, 40: 360, 1953.

A total of 142 cases of malignant melanoma in Glasgow formed the basis of a discussion of the clinical course, survival rates, histology and treatment. The highest incidence is in females in the fifth to eighth decades; the commonest site, the foot and ankle. In 40% the lesion originated in a pre-existing mole. A poorer result followed treatment in the head, neck, trunk and perineum sites. After 5 years the survival rate was 47% of the standard death rates. A study of the cell type and reticulum content of each tumour failed to be of value in prognosis.

Statistical analysis showed that the prognosis in females under 50 years is noticeably better than in females past the menopause or in males at any age. Although many of the tumours were treated by local excision only, and this often seemed less than suitably radical, about 40% survived 5 years; in females under 50, 74% survived 5 years.

It is suggested that a 5 cm. margin of healthy skin should be removed together with a wider excision of deep fascia. This means frequent grafting. Biopsy should not be performed. Block dissecting of the regional nodes is recommended. Radiotherapy is of no value.

BURNS PLEWES

#### PÆDIATRICS

##### *A Statistical Study of Otitis Media in Children. II. The Antibiotic Era.*

HELLER, G.: *J. PEDIAT.*, 42: 185, 1953.

Myringotomy is, in most cases, an unnecessary procedure. Sulfonamide or penicillin therapy is rapidly effective in returning the acute ear to normal. Phenol, 5% in glycerin is the most effective form of ear drops. Nasal drops do more harm than good as long-term use causes ciliary damage, and antiseptic substances may cause local reactions, also the use of nasal drops may precipitate an aural or sinus infection. Oral penicillin is effective, unless the baby is very young, or the child is vomiting, refractory, or acutely ill, penicillin or other medication may be given by mouth whenever possible. If penicillin is to be injected a large dose should be given as this causes an active bacteriostasis and allergic reactions are no more prone to occur than with smaller doses. A small baby will tolerate 300,000 units of procaine penicillin and 200,000 units of penicillin G, freshly mixed at the bedside. Older children will tolerate



a palatable solution of 100,000 to 200,000 units four times daily; this may be combined with Gantrisin or a triple sulfonamide preparation giving 1 to 1½ grains per pound of body weight per day. The oral dose of penicillin is continued for at least 4 days. If recovery is not prompt a change from one therapeutic agent to another is indicated.

J. A. STEWART DORRANCE

*The Incidence and Significance of Systolic Cardiac Murmurs in Infants.*

TAYLOR, W. C.: ARCH. DIS. CHILD., 28: 52, 1953.

The material for this investigation consisted of all newborn babies examined at the Simpson Memorial Maternity Pavilion, Edinburgh, over a 5-month period; the total number of babies examined was 1,133. The results of this investigation are in agreement with the experience of other observers. The differences in the recorded incidence of systolic murmurs in the newborn are probably due to the subjective nature of the examinations required to detect their presence, but 2 to 5% of infants present such murmurs. The majority of these murmurs must be due to "physiological" causes as they usually disappear by the age of 3 months, but occasionally persist to the age of 1 year. Possible physiological causes are the patency of the foramen ovale and the ductus arteriosus. The foramen ovale has closed in 95% of infants and the ductus arteriosus in 99% by the age of 1 year. In 14 of the 20 children followed up to the age of 2 years in the present series the murmur had disappeared by the age of 1 year, whereas in each of the children with persistent murmurs a diagnosis of congenital heart disease had been made.

The intensity of the murmur does not appear to be of any diagnostic value, as the loud Grade III or Grade IV murmurs may disappear within a few days or weeks. A consideration of the intensity of the murmur combined with its persistence may be of some value. Thus the transient soft systolic murmur is the one least likely to be associated with congenital heart disease. The infant with a loud persistent systolic murmur is more likely to be suffering from congenital heart disease, but in the absence of other diagnostic evidence the diagnosis may remain in doubt until after the age of 1 year.

In this series of 1,133 newborn infants systolic murmurs were detected in 54 (4.8%). In a selected group of 20 infants the murmur had disappeared by the age of 1 year.

J. A. STEWART DORRANCE

*Poor Appetite in the Newborn and Young Infant.*

J. PEDIAT., 42: 505, 1953.

Poor appetite in children, unassociated with a demonstrable organic disease, is generally regarded as psychogenic. Young children find in finickiness about food and in refusal to eat a ready means of asserting themselves, of gaining attention, and of spiting their parents. These reactions on the part of children are elicited and reinforced by parental overdirection and rejection, by parental insistence on particular foods which they have been led to believe are "good" for their children, and by feeding uninterestingly prepared foods. It is apparent that there are innate differences in the intensity with which hunger sensation is experienced and that certain children may be poor eaters from birth or early infancy on the basis of their genetic endowment. As the usual circumstances leading to poor appetite in young children are becoming more clearly understood, and as measures are being taken to avoid them, one may expect that an inborn poor appetite will become a more important consideration in assessing the child who eats poorly.

J. A. STEWART DORRANCE

*The Diagnosis of Acute Meningitis in Infancy.*

HAWORTH, J. C.: LANCET, 1: 911, 1953.

Despite the use of sulfonamides and antibiotics, the fatality rate of infants suffering from acute purulent meningitis is still too high. The author believes that one of the chief reasons for this is a delayed diagnosis. The cardinal symptoms of the disease, i.e., increased fontanelle tension, neck stiffness, and Kernig's sign, are often absent in the young infant. Of the 50 cases studied, 26% showed none of the classical symptoms. Dehydration was present in some cases accounting for the absence of the bulging anterior fontanelle. In the very young infants the flexible fontanelle and sutures compensated the increased pressure.

A plea is made for the routine use of prophylactic anti-convulsant therapy since 57% of infants developing convulsions proceeded to death. Lumbar puncture should be done on any infant who has fever, vomiting, is usually drowsy or irritable, has a vacant look, or a recent squint; who is more ill than can be explained by physical signs; who does not make the expected response to treatment for a disease such as pneumonia or gastro-enteritis. Do not wait for the text book picture—it will be too late.

ISABEL M. LAUDER

*Behaviour in Childhood.*

CAPON, N. B.: LANCET, 1: 861, 1953.

Each child is a complex personality and presents different problems. Although many attempts have been made to categorize child behaviour none have proven wholly satisfactory. The author stresses the fact that, although heredity plays its part, many displayed characteristics are more often apt to be the result of mimicry rather than inherited tendencies. The understanding parents will recognize their children's tendency to hero-worship and will play it up by setting the example. The ability to imitate is basically protective. The failure of the parent to understand this and set the proper pattern in the home may lead to unnatural and objectionable behaviour. The most successful parents teach by example rather than by command. They allow the child some latitude for trial and error in order that the imposed discipline may lead to its highest form, i.e., self-control.

Parents faced with raising a family in undesirable environments, such as highly industrialized districts, should have adult education as well as material assistance. The author, in analyzing 450 child patients, found complaints were due to upbringing rather than disease. These complaints included habit spasm, speech defects, breath holding, night terrors, and anti-social behaviour. The lives of most of these children had been lacking in one or two cardinal advantages; security at home, and/or reasonable discipline.

Of all resources given to man to guide their future none offers better promise than the upbringing given to their children.

ISABEL M. LAUDER

**THERAPEUTICS**

*The Treatment of Acute Hypotensive States with l-Norepinephrine.*

LIVESAY, W. R. AND CHAPMAN, D. W.: AM. J. M. SC., 225: 159, 1953.

Norepinephrine was administered to a group of patients in acute peripheral circulatory collapse from various causes. A total of 22 patients were treated; of these five had suffered acute pulmonary emboli, six had acute myocardial infarction, one had been given intravenous aminophyllin in the treatment of congestive heart failure, two cases complicated the use of hexamethonium, one

patient had an incompatible blood transfusion reaction, two patients with severe coronary insufficiency had post-operative shock, one patient with refractory paroxysmal auricular tachycardia was complicated by shock: Profound shock was encountered in a case of acute leukaemia with massive hæmorrhage, in another individual with extensive second and third degree burns, and in chronic cor pulmonale with acute barbiturate intoxication.

Four milligrams of 1:1,000 norepinephrine were added to 1,000 c.c. 5% glucose in water. The pressor effect produced by intravenous drip infusion determined the rate of administration. In a few cases when a failure to obtain a satisfactory elevation of blood pressure occurred, the concentration of the remaining solution was increased by adding an additional four to eight mgm. of 1:1,000 norepinephrine. Treatment was started immediately after detection of the shock state in the majority of cases. All the cases were followed by frequent blood pressure and cardiac rate determinations at 5 to 15 minute intervals after a relative degree of stabilization had been reached. Serial electrocardiographic tracings, when possible, were obtained.

A definite pressor response bringing the blood pressure out of the shock range was obtained in 20 out of the total number of 22 patients studied. In one of the two cases which failed to respond there was a possibility that norepinephrine may have caused ventricular fibrillation when its concentration was steadily increased in an attempt to obtain a pressor effect. In seven of these cases, it was thought that the use of the drug had been the single most important factor in saving the patient's life. The result of treatment was poorest in those cases who suffered from so-called "cardiogenic shock".

In all cases in which it is contemplated that norepinephrine will require continuous intravenous administration over several days, it is as well to insert and well advance a small poly-ethylene tube into a vein and secure it in place. Careful control of the pressor effect by attention to the rate of drip and the height of the blood pressure during administration is essential at all times. Adrenal cortical steroids and antihistamines may have a potentiating pressor effect.

B. L. FRANK

#### *Crystalline B<sub>12</sub> Inhalation Therapy in Pernicious Anæmia.*

MONTO, R. W., REBUCK, J. W. AND BRENNAN, M. J.: AM. J. M. Sc., 225: 113, 1953.

Of the previously suggested routes for the administration of vitamin B<sub>12</sub> in the treatment of pernicious anæmia, parenteral administration alone has thus far proved satisfactory. The oral, as well as the sublingual, administration has resulted in unsatisfactory clinical and hæmatologic response, except when given in massive doses or in conjunction with the intrinsic factor. Success of the parenteral administration depends upon the ready access of the injected material to capillaries and lymphatics. One of the largest capillary beds in the body which contacts the external environment is that of the pulmonary circulation. Inhalation, therefore, seemed to be a logical route for the administration of vitamin B<sub>12</sub>. In this series, crystalline B<sub>12</sub> in physiological saline solution, without the addition of a preservative, was utilized in two cases. In a third case, 1,000 micrograms of crystalline B<sub>12</sub> in 0.1 c.c. by volume of lactose powder was used for administration as a dust. The B<sub>12</sub> lactose powder was administered by means of a dust inhaler. The patient was directed to take ten deep inhalations per administration at the times corresponding to usual parenteral dosage schedules.

Satisfactory clinical and hæmatologic responses were obtained in all three patients. There was no objective or subjective evidence of toxicity or sensitivity at the pulmonary site. Although these results are encouraging, they constitute only preliminary observations as to

the efficacy of the inhalation of crystalline vitamin B<sub>12</sub> in the treatment of pernicious anæmia and further investigations will concern the question of long-term maintenance.

B. L. FRANK

## PUBLIC HEALTH

### *The Importance of Food in Preventive Medicine.*

ELVEHJIM, C. A.: AM. J. PUB. HEALTH, 43: 523, 1953.

Even though the deficiency diseases are often submarginal and their effect not spectacular, nutrition remains as the most important environmental factor affecting our health. Improper dietary habits are increasing, and they are aided and abetted by so-called "food specialists" some of whom succeed in attaching an M.D. to their names.

However, due to research conducted by well-established authorities, the field of nutrition is expanding rapidly, so rapidly in fact, that the practitioner must constantly review and reassess his knowledge. Radical changes in a few years have seen the pendulum swinging from a low protein diet to a high one. This author does not think any harm can come from the high diet *per se* but rather from too rapid a transition from the high diet to low.

The author makes a plea for less inertia on the part of physicians in obtaining aid from recognized food specialists, the nutritionist and dietitian. He specifically cites pædiatric nutrition which, though probably as far advanced as any, is not as good as it should be. He expresses the fear that even slight changes in metabolism during infancy may cause harm in adult life. One major problem of reducing diets is mathematical. The total fuel taken in must be less than that needed. The greater problem lies in obtaining for the dieting patient adequate minerals and vitamins in the daily intake. Sound nutrition depends upon a balance between all nutrients at a given time.

Since food fadism thrives on half-truths and speculation regarding nutritional questions which have not been adequately studied, it is hoped that schools of medicine will give more serious thought to an adequate, basic presentation of this important field to their students.

ISABEL M. LAUDER

## INDUSTRIAL MEDICINE

### *The Incidence of Accidents in Relation to the Annual Cycle.*

SCHULZINGER, M. S.: INDUST. MED., 22: 49, 1953.

That there is a seasonal fluctuation in the frequency of injuries by accident, has been observed for many years. Available literature on the subject has been meagre and inconclusive. In this article the author presents his own detailed analysis of 12,820 industrial and 8,202 non-industrial accidents by age, sex and monthly and seasonal distribution of occurrence. On the basis of his analysis and the studies previously reported he makes the following suggestions:

1. The incidence of injury is characterized by a higher proportion in the summer and a lower proportion in winter.
2. The incidence of injury follows a relatively fixed annual pattern, increasing steadily from a low in February to a high in June and August and then declining.
3. The peak month of injury shifts with increasing age in the male, from June-July to August and September,



while the peak month of injury for females of all ages is August.

4. The percentage of summer injuries and the range of difference between the high incidence of summer and the low incidence of winter narrows significantly with increasing age.

5. The causes of seasonal fluctuations of accidents have not been fully determined. Seasonal and climatic stresses on body and spirit probably play an important rôle. High and low temperatures, as well as a host of social and economic factors also have an important influence.

A number of tables and figures illustrate the discussion. In addition to the evidence presented and analyzed, reference is made to various superstitions and traditions which have influenced man's thinking in connection with this seasonal fluctuation not only in incidence of injury but in that of illness and death rates. The authors draw special attention to the fact that the summer months apparently constitute a major hazard particularly in young people under 30 years of age. This 3-month period, therefore, should merit special attention in preventive efforts, as well as in research.

MARGARET H. WILTON

*The Value and Limitations of Screening Techniques in Industrial Hygiene.*

FASSETT, D. W. AND STERNER, J. H.: NEW YORK STATE J. MED., 52: 2613, 1952.

That the pattern of occupational disease screening tests will depend on the extent of knowledge of the substance and conditions, the screening techniques being adapted to the specific industry, is indicated by this article, one of the papers in a symposium on multiphasic screening programs which was presented at the 146th annual meeting of the Medical Society of the State of New York, in May, 1952.

The expanding variety of chemicals and of physical agents introduced in modern industry and the preponderance of exposures in small plants, have led to increasing difficulties in the control of occupational disease. Correct interpretations and control are made possible only by the integration of information from toxicologic, environmental and clinical studies. After outlining the present approaches in toxicology and environmental study, the authors deal more particularly with the clinical examination of workers. To detect the earliest possible deviation from normal is one objective; another is the demonstration of lack of any deviation from normal in groups of workers in known environments. There are three ways to attain these objectives: (1) the epidemiological approach; (2) the actual examination and study of the patient; and (3) the statistical analysis of the data obtained and comparison of the findings in the exposed groups with those in non-exposed groups of comparable age, sex, etc. Each approach is carefully assessed. Details are given to several studies conducted and the nature of the findings.

Based on their own experience the authors conclude that where little is known about a substance, complete clinical and laboratory studies will be necessary to detect injury. When toxicologic studies indicate specific types of injury or detoxifying mechanisms and when the conditions of exposure are known, more specific and less costly tests can be used. In occupational disease screening the primary object is often the detection of slight shifts in group characteristics rather than the uncovering of manifest disease in individuals. In the detection of either occupational or non-occupational disease the authors have found that haemoglobin, cell volume, white and differential counts, cephalin flocculation, urine studies and x-rays are the most efficient of the common laboratory tests. The fact that little occupational illness was found in their screening of workers suggested to them the need for further refinement and specificity in the methods.

MARGARET H. WILTON

## FORTHCOMING MEETINGS

### CANADA

CANADIAN PUBLIC HEALTH ASSOCIATION, 41st Annual Meeting, Royal York Hotel, Toronto. (C.P.H.A., 150 College St., Toronto 5) October 1-2, 1953.

NOVA SCOTIA DIVISION, C.M.A., Centennial Meeting, Nova Scotia Hotel, Halifax, N.S. October 6-9, 1953.

INTERNATIONAL ANÆSTHESIA RESEARCH SOCIETY, 28th Annual Congress, Chateau Frontenac, Quebec, P.Q. (Dr. A. William Friend, Chm. Program Committee, 515 Nome Avenue, Akron, Ohio) October 26-29, 1953.

CANADIAN ASSOCIATION OF OCCUPATIONAL THERAPY, Annual Convention, Royal York Hotel, Toronto, Ont. (Miss Isobelle Galger, Can. Assoc. of Occup. Therapy, 331 Bloor St. West, Toronto 5, Ont.) October 31-November 2, 1953.

### UNITED STATES

AMERICAN COLLEGE OF SURGEONS, Conrad Hilton Hotel, Chicago, Ill. (Dr. M. L. Mason, Secretary, 40 E. Erie St., Chicago, Ill.) October 5-9, 1953.

AMERICAN ACADEMY OF PÆDIATRICS, Municipal Auditorium, Miami, Fla. (Dr. E. H. Christopherson, Secretary, 610 Church St., Evanston, Ill.) October 6-9, 1953.

AMERICAN SOCIETY OF ANÆSTHESIOLOGISTS, Olympic Hotel, Seattle, Wash. (Dr. J. E. Remlinger Jr., Secretary, Room 1101, 188 W. Randolph St., Chicago, Ill.) October 6-9, 1953.

NATIONAL GASTROENTEROLOGICAL ASSOCIATION, 18th Annual Convention, Los Angeles, Calif. (Dr. Samuel Weiss, 146 Central Park West, New York 23, N.Y.) October 12-14, 1953.

AMERICAN PUBLIC HEALTH ASSOCIATION, 81st Annual Meeting, New York, N.Y. (A.P.H.A., 1790 Broadway, New York 19) November 9-13, 1953.

AMERICAN MEDICAL ASSOCIATION, Clinical Session, St. Louis, (Dr. George F. Lull, 535 N. Dearborn St., Chicago 10, Ill.) December 1-4, 1953.

### OTHER COUNTRIES

INTERNATIONAL CONGRESS OF PÆDIATRICS, Havana, Cuba. (Prof. Felix Hurtado, President, 5a Avenue 124, Miramar, Havana, Cuba) October 12-17, 1953.

RADIOLOGICAL SOCIETY OF NORTH AMERICA, Palmer House, Chicago, Ill., December 13-18, 1953.

INTERNATIONAL CONGRESS OF INTERNATIONAL COLLEGE OF SURGEONS, Sao Paulo, Brazil. (Dr. Max Thorek, Secretary-General, 1516 Lake Shore Drive, Chicago, Ill.) April 26-May 2, 1954.

INTERNATIONAL GERONTOLOGICAL CONGRESS, London and Oxford, England. (Prof. R. E. Innbridge, President, General Infirmary, Department of Medicine, The University, Leeds, England) July 12-22, 1954.

INTERNATIONAL CONGRESS FOR PSYCHOTHERAPY, Zurich, Switzerland (Dr. H. K. Fierz, Secretary General, Theaterstrasse 12, Zurich 1, Switzerland) July 21-24, 1954.

INTERNATIONAL CONGRESS ON OBSTETRICS AND GYNÆCOLOGY, Geneva, Switzerland. (Dr. H. de Watteville, President, Maternité Hôpital, Cantonal, Geneva, Switzerland) July 26-31, 1954.

## NEWS ITEMS

### ALBERTA

Dr. H. W. Soby of High River has given up his popular practice and left a multitude of grateful patients and friends of that district. After twenty-five years of practice Dr. Soby was asked to take over an important position with the Immigration Department in Europe. During the past two years Dr. Soby was Chairman of the Public Relations Committee of the C.M.A. Alberta Division, and has published articles on this very important aspect of medical practice. We all wish Dr. Soby continued success in his new field of endeavour.

We regret to announce the fatal air accident to Dr. Gurth O'Brien of Grande Prairie. Dr. O'Brien was a graduate of the University of Alberta and served with the R.C.A.M.C. during the last war. He practised with his father until the retirement of this grand pioneer doctor of Northern Alberta.

The poliomyelitis epidemic is again with us in Alberta, as elsewhere. This often crippling disease will be conquered in due time, just as diphtheria, smallpox and scarlet fever have been in the past. Until then we must grope in the deep veil of the mysteries of some diseases. There are still great opportunities for research in all branches of medicine.

Dr. G. Donald Carson, an Alberta graduate, has taken up practice in psychiatry in Edmonton. Dr. Carson took his training in this specialty in Chicago and the Eastern United States.

A valuable review of Rabies in Northern Alberta will be found in the August issue of the *Alberta Medical Bulletin*, by Dr. M. P. Jackson of Keg River, Alberta.

W. CARLETON WHITESIDE

### BRITISH COLUMBIA

Medical men in British Columbia are looking forward to the Annual Meeting of the B.C. Division Canadian Medical Association on September 21 to 25, at the Hotel Vancouver. Highlights of the meeting will be addresses by Sir Charles Symonds of London, England, Dr. R. S. Judd of the Mayo Clinic, Dr. J. Kilgour of Winnipeg, Dr. Harold M. U'ren of Portland, Oregon, and Dr. Ross Vant of Edmonton, Alberta.

Members of the U.B.C. Medical Faculty are giving papers, also. These include Dr. J. Eden, Assistant Professor of Biochemistry, Dr. Geo. Davidson, Professor of Psychiatry, and others. Dr. M. M. Weaver, Dean of the Medical Faculty, will give an account of the early years of the faculty, its founding and progress.

A Hobby Show is to be held, a golf tournament has been arranged, and a varied program of entertainment is being provided.

Dr. C. W. Burns, President of the Canadian Medical Association, will be our guest, and will speak at the Annual Luncheon, as well as delivering a paper.

At the Annual Dinner, to be held on September 25, Colonel F. T. Matthias, head engineer of the great Aluminum Company of Canada at Kitimat, will be the guest speaker. Colonel Matthias is an international figure in engineering and his address should be of the greatest interest.

The B.C. Surgical Society, at its last Annual Meeting, decided to offer an annual prize of \$200.00 for the "Best Paper of the Year". This is open to students or graduates under the age of 35 years, a most attractive offer, which should lead to a great deal of good work. Papers accepted will be read at the meeting of the Society, but for purposes of publication will be the property of the author entirely.

The Annual Report of the Children's Hospital has recently been published, and shows steady growth, more than 25,000 hospital days for in-patients, and 11,000

odd out-patient visits. The Directors of the Hospital plan expansion as soon as this is possible, and are securing extra land for this purpose. A noticeable item is that of donations and bequests, which amounted to \$124,000.00 for the year 1952,—a very gratifying amount for what is really a small hospital, but one whose standing with the public is very high. The March of Dimes was undoubtedly a considerable factor in achieving this result, but more and more people are devising bequests to this hospital.

A new Cancer Unit has been formed at Golden, known as the Golden and District Cancer Unit, following a visit made by Mrs. Dawson, of Vancouver, secretary of the provincial branch of the Canadian Cancer Society.

The work of the Unit will be along public educational lines, practical aid in making diagnoses of the disease, follow-up treatment and welfare assistance. Dr. E. G. Lapp is the honorary President, with Mrs. Thomas Sime as President, R. E. Jones, Vice-President, and Mrs. J. J. Yurick, Secretary.

Dr. M. J. Hardie of the Vancouver Health Department, has won a bursary for postgraduate work in public health, and has been given leave of absence by the City Council to enable her to take a special course in public health and preventive medicine in Toronto under a federal health grant.

The ranks of women physicians practising in B.C. have suffered their first break in the death of Dr. Isabel Day, who served in the first World War, and was decorated for her work, has practised in Vancouver for many years, and has been active in connection with the Victorian Order of Nurses, St. John's Ambulance, and many similar organizations.

The Canadian Cancer Society, B.C. Division, has made a gift to the B.C. Medical Research Institute of a \$23,000.00 spectrophotometer, to be used in research, especially in regard to the problem of diagnosis of cancer, and the management of the disease.

Dr. John Eden, Assistant Professor of Biochemistry at the University of British Columbia, and Assistant Director of the Department of Pathology at the Vancouver General Hospital, will be in control of its use.

J. H. MACDERMOT

### MANITOBA

Poliomyelitis continues in epidemic form. On August 27 the total cases in the Province were 1,139, exceeding the 1,011 cases in 1941. It is proportionately more severe with 33 deaths as against 20 in 1941, and 30 deaths in 1952 when there were 841 cases. However, only 17 of the cases developed within the past week. Ten iron lungs arrived in Winnipeg on August 26 from Boston on an R.C.A.F. plane, and they will be put into use as required. Schools in Greater Winnipeg have postponed opening date to September 14.

The Joint Hospital building fund still needs almost \$200,000 to reach the objective of \$3,000,000 by public subscription.

ROSS MITCHELL

### NEW BRUNSWICK

Dr. G. A. Olmstead has been appointed Chairman of the Woodstock Board of School trustees.

Construction has been started on the New Brunswick Polio Building, adjoining the Victoria Public Hospital in Fredericton. It is estimated that the building will cost \$495,150.00 and will be completed by the middle of 1954. It will house clinics for Arthritis, Cancer, Tuberculosis and Mental Health and Hydro-therapy service and in addition there will be space for a branch of the Provincial Laboratory system.



Dr. R. A. H. MacKeen, Director of New Brunswick Laboratories has been a patient for some time in the Saint John General Hospital and is now convalescing at his home in Rothesay.

Services in the new Moncton Hospital have been established following a smooth transfer of patients by a fleet of ambulances from the old to the new hospital. The Saint John Ambulance Brigade contributed an ambulance and a bearer party to aid in the movement of patients. Dr. D. F. W. Porter, Executive Director of the hospital, and his staff are justly proud of their splendid hospital plant which is the result of excellent teamwork in planning and executing a project desired by Moncton City and the County of Westmorland. All departments in the hospital are modern and efficiently staffed, but perhaps special mention should be made of the Radiological Department, directed by Dr. H. L. Ripley, where diagnostic and therapy branches have been increased. Soon a branch of the New Brunswick Laboratories will be established in a new building now under construction.

Dr. D. T. Tonning of the Medical Faculty of Dalhousie Medical School recently visited his family and friends in New Brunswick.

A copy of the Coronation Number of the Alberta Medical Bulletin was much enjoyed by this reporter and the Staff of the Saint John General Hospital. Our copy was received from the Editor, Dr. W. C. Whiteside, who is remembered as a surgeon who served with the Army in New Brunswick during the last war. A. S. KIRKLAND

## NOVA SCOTIA

Dr. K. A. MacKenzie, F.R.C.P. retired from his position as senior consultant in medicine at Camp Hill Hospital September 1. Dr. MacKenzie has been associated with that institution continuously since 1920 as a medical specialist. He had long service in World War I with the C.A.M.C. and joined the staff of Camp Hill Hospital shortly after returning from overseas. Dr. MacKenzie has also held the position of Professor of Medicine at Dalhousie University from which he retired in 1947. He is a past president of the Canadian Medical Association and of the Medical Society of Nova Scotia.

Dr. W. I. Morse, Demonstrator in Medicine, Dalhousie University, has been awarded a R. Samuel McLaughlin Travelling Fellowship for one year starting September 1, 1953. Dr. Morse will be associated with Dr. A. Baird Hastings, Professor of Biological Chemistry, Harvard Medical School, Boston.

Among the notable events taking place in conjunction with the centenary of the Nova Scotia Medical Society and the Dalhousie Refresher course being held October 5 to 9 will be an official reunion of Dalhousie Medical Graduates on October 8.

Dr. T. E. Kirk, Senior Treatment Officer, Camp Hill Hospital, and Sister Catherine Gerard, Superintendent of the Halifax Infirmary, attended meetings of the American College of Hospital Administrators and the American Hospital Association held at the Palace Hotel, San Francisco, August 29 to September 2.

Dr. Wallace Roy has been appointed Head of the Radiology Department, Victoria General Hospital, following the retirement of Dr. S. R. Johnston, August 1. Dr. Roy and Mrs. Roy have just returned after a 3 months' trip to England and the Continent. While there Dr. Roy spent two months in London studying and visiting x-ray departments in the various hospital teaching centres. From July 19 to 25 Dr. and Mrs. Roy attended the International Congress of Radiology held in Copenhagen.

Dr. J. Gordon Kaplan, Assistant Professor of Physiology, Dalhousie University, spent the summer months in France where he has been conducting research investigation at several marine biological laboratories.

C. M. HARLOW

## QUEBEC

No doubt the first news this month from Quebec concerns the 19th International Physiological Congress. McGill University and the University of Montreal are hosts to more than 2,000 delegates from 48 countries. More than 700 scientific papers will be delivered during the four days of scientific sessions, plus a symposium mornings and afternoons. The organizing committee under the chairmanship of Dr. Frank MacIntosh, professor of physiology at McGill University, seem to have worked out all the details of organization to assure success.

The new Maisonneuve Hospital in Rosemount, Montreal, has received a grant of more than \$99,000 under the Federal-Provincial health grant scheme for equipping the hospital's projected Institute of Cardiology. First of its kind in Quebec, the new treatment and research centre will occupy the top three floors of the Maisonneuve Hospital where it will have operating rooms, laboratories and beds for 42 patients. The Institute is directed by Dr. Paul David, assisted by Dr. Leon Lebel, and has on its research and surgical staff Dr. A. Vineberg, assistant professor of surgery at McGill University, and Dr. E. G. Gagnon, assistant professor of surgery at the University of Montreal.

Diseases of the heart and arteries are the leading cause of death in Canada, but, contrary to common opinion, these diseases are not confined to the older age groups. Statistics gathered in the United States show that nearly a quarter of all deaths in the 25 to 44 age range in that country are attributable to diseases of the heart and arteries, and they are also the cause of extensive and prolonged disability among younger people.

We hope that the Institute of Cardiology will provide a research centre where skilled scientists can develop new techniques of diagnosis and treatment and contribute to medical progress in this field. The federal grant will be used entirely for the purchase of specialized equipment needed for the laboratory of experimental surgery, the operating rooms, the radiology and other departments of the Institute.

At the same hospital a new school of nursing to provide basic nursing training in two years is to be opened this September, also financial assistance from a federal health grant. This will be an experiment with a three-fold objective: (1) to improve clinical instruction of student nurses by ensuring more adequate supervision; (2) to improve courses of study, with emphasis on a better understanding of human nature and the rôle of the nurse as the doctor's assistant; and (3) to improve means of developing a greater sense of responsibility among nurses.

Several experiments in nursing education have been carried out or are under way in Canada at the present time in an effort to increase the supply of nurses. One of these was the Metropolitan School of Nursing, Windsor, and others are at the Toronto Western Hospital and at the School of Nursing, McMaster University, Hamilton. The Maisonneuve School is the first of its kind in Quebec.

According to the 1951 census, Quebec has the second lowest supply of nurses in ratio to its population among the 10 provinces. The new course was worked out in co-operation with the Institut Marguerite d'Youville, Montreal, and the school will be directed by the Reverend Sister Dion.

It is anticipated that about 100 nurses will be accepted each year. The first two years allow for intensive training in the more theoretical aspects of nursing. In the third year the nurse will enter the hospital and serve

on the wards on salary. This part of her work will be supervised by specially-trained monitors to ensure that high quality nursing results. The federal grant of \$34,500 for the current fiscal year will meet part of the cost of salaries for the teaching staff and for the purchase of teaching equipment.

The University of Montreal this year plans to open a special training course for technicians to serve in hospitals and clinical laboratories. A grant of more than \$34,000 from federal funds will assist the university in organizing and carrying on the course. For some time there has been a marked shortage of well-trained laboratory technicians, and the establishment of new hospitals and clinics, the development of new diagnostic and treatment procedures, and a general increase in the scope of public health have all contributed to the urgent need for competent technical personnel.

The course planned by the Faculty of Medicine of the University of Montreal will require 21 months to complete, with registration open to 25 students in the first year. Both men and women will be accepted for training, provided they have the necessary academic background. The first year includes courses in biology, chemistry, histology, statistics and bacteriology. The second year is devoted mainly to practical work in hospital laboratories, with academic courses in biochemistry and anatomy. A diploma will be awarded on successful completion of the course.

Development of this training program should help substantially in overcoming personnel shortages in this field, and in raising the standard of laboratory work available to the medical and public health professions. Approximately \$16,000 of the federal grant will be used to buy scientific equipment and supplies for the training course, and the remainder will help meet the salaries of the instructors.

Four Montreal doctors are among the delegates attending the First World Conference on Medical Education held at the B.M.A. House, London, England. McGill University was represented by Dr. Lyman Duff, Dean of Medicine and professor of pathology, and Dr. D. Ewen Cameron, professor of psychiatry and director of the Allan Memorial Institute. Dr. W. Bonin, Dean of Medicine, represented the University of Montreal, and Dr. H. E. MacDermot, editor of the Journal, was one of the C.M.A. representatives.

Following the Conference Dr. MacDermot will attend the Annual Meeting of the W.M.A., while Dr. Duff will remain in Europe and tour a number of medical schools in Scandinavia and Ireland.

Dr. E. G. D. Murray, Professor of Bacteriology, McGill University, heads the Canadian delegation to the 16th International Congress of Microbiology at Rome, Italy, September 6 to 12. He is vice-president of one of the sections of the congress and a member of several of its committees. Dr. Victorin Fredette, assistant director of the Institute of Microbiology and Hygiene and professor of Bacteriology at the University of Montreal, is also a member of the Canadian delegation.

After the congress Dr. Murray will visit Paris and England where he will lecture. A. H. NEUFELD

## SASKATCHEWAN

Poliomyelitis so far this year has been relatively mild in Saskatchewan in marked contrast to the severe epidemic experience last year. In 1952, 1,223 cases were reported with a death toll of 89.

Mr. John Smith, Superintendent of the Yorkton General Hospital, has been elected President of the Saskatchewan Hospital Association, succeeding Dr. H. B. Myers of Rosetown.

Dr. Humphrey Osmond has been appointed Acting Superintendent at the Saskatchewan Hospital at Weyburn. Previous to his arrival in Canada in 1951, Dr. Osmond was attached to the Royal Navy as a psychiatric specialist, and had been on the staff of Guy's and St. George's Hospitals.

The Provincial Department of Public Health plans to expand its program of physical restoration work for crippled persons assisted by the National Health Grants.

Special efforts will be made in the near future towards the recruitment and training of more personnel to assist and build up this branch of Public Health planning.

Some fifty Weyburn business and professional men attended a farewell reception for Dr. A. R. Coulter on the occasion of the termination of his duties as Superintendent of the Saskatchewan Hospital at Weyburn.

Dr. Coulter has been Superintendent for the past five years at Weyburn, and while there had taken an active part in all civic undertakings. His Honour, Mayor (Dr. F. C. F.) Eaglesham, presented Dr. Coulter with a set of golf clubs and bag on behalf of the Chamber of Commerce.

Two men from Saskatchewan were among the winners of 21 Medical Fellowship awards made available by the National Research Council. Dr. D. E. Bergsogel of Outlook, and Dr. A. M. Marko of Krydor both won graduate medical research fellowships.

Dr. Bergsogel will study at the University of Oxford, and Dr. Marko will study at the National Institute for Medical Research, London, England.

The residents of Swift Current Health Region were recently notified that subsequent to August 10, 1953, they will be required to pay \$1.00 towards each office call, \$2.00 for each house visit, and \$3.00 for each night house visit.

These changes are being introduced as a result of consultation between the Regional Health Board and the Swift Current and District Medical Society, and were based largely on the experience gained from last year, when a utilization fee was introduced for the first time in this scheme on house visits.

It is hoped that by these new changes, they will avoid over expenditure of the medical care budget reducing the demand for care, and so permit the doctors time to devote greater attention to those patients needing it.

G. W. PEACOCK

(Continued from page 441)

2. It would appear that this medication effects a considerable decrease in the incidence of post-anæsthetic vomiting: from 23% in the control group to 9% in the treated group.

3. Finally, it seems sensible, safe and practical to administer Gravol solution, both pre- and post-operatively, to reduce the possibility of vomiting in surgical anaesthesia.

## REFERENCES

1. GAY, L. N. AND CARLINER, P. E.: *Bull. Johns Hopkins Hosp.*, 84: 470, 1949.
2. DE FEO, E. AND NATHAN, M. H.: *Radiology*, 56: 420, 1951.
3. CARLINER, P. E., RADMAN, H. M. AND GAY, L. N.: *Science*, 110: 215, 1949.
4. KERMAN, E. F.: *J. A. M. A.*, 141: 478, 1949.
5. LAMAR, C. P.: *J. A. M. A.*, 141: 938, 1949.
6. MILLET, D. K. AND HENRY, M. O.: *Minnesota Med.*, 34: 1096, 1951.
7. RUBIN, A. AND METZ-RUBIN, H.: *Surg., Gynec. & Obst.*, 92: 413, 1951.



NEWS OF THE MEDICAL  
SERVICES*Canadian Armed Forces*

Captain M. Ryan a physician from the United Kingdom was appointed to a commission in the Canadian Army Active Force. Since his recent arrival in Canada he has been employed at Valcartier Station Hospital.

For the first time in the history of the R.C.A.M.C. a Reserve Force National Camp was held at Camp Borden from July 19 to August 1. Units from British Columbia to Newfoundland were represented at the Camp and they arrived by road, rail and air. During the first week training classes were conducted for Senior and Field Officers, Nursing Sisters, Junior Officers, Senior NCO's, Junior NCO's, Hygiene Assistants, Medical Assistants, Cooks and Drivers.

Much enthusiasm was exhibited during the second week when unit field exercises were held and the manner in which these were carried out was most impressive. Many personnel attending qualified for rank or promotion and during a formal ceremony, certificates were presented. Great interest was expressed by Reserve Force participants generally and the Camp was a great success.

Three Medical Officers, 22 Nursing Sisters, and 20 Medical Assistants from the Armed Forces were sent to Winnipeg in August to assist civil medical authorities in combating the polio epidemic. Under the direction of Colonel C. G. W. Wood of Winnipeg, Prairie Command Medical Officer, the Navy, Army and Air Force doctors, nurses and medical assistants worked out of the Winnipeg Military Hospital but moved around the city as required.

## NEWS AND NOTES

FEDERAL MENTAL HEALTH  
CHIEF HONOURED

Dr. Charles A. Roberts, chief of the mental health division of the federal health department, has just been requested to serve on a World Health Organization expert advisory panel on mental health and has been elected a fellow of the American Psychiatric Association. As a member of the WHO panel of experts, Dr. Roberts will keep the WHO informed on important developments in mental health in Canada and may be called on, either by meetings or correspondence, to advise the WHO on mental health problems. Dr. Roberts will carry out his advisory work for WHO in addition to his present duties.

Dr. Roberts, who was born in St. John's, Nfld., has been in charge of the federal government's health work since 1951. Prior to that he was for nearly six years superintendent of the Hospital for Nervous and Mental Diseases, St. John's and for 15 months superintendent of the St. John's General Hospital. He is a graduate of Dalhousie University.

NATIONAL FOUNDATION FOR  
INFANTILE PARALYSIS

Dr. Henry W. Kumm of Chocorua, N.H. and New York City, has been appointed director of research of the National Foundation for Infantile Paralysis. Dr. Kumm, who had spent 23 years on the staff of the Rockefeller Foundation for Medical Research before joining the National Foundation in July, 1951, replaces Dr. Harry M. Weaver of Bedford Village, N.Y., who has resigned.

Well known for his part in the Rockefeller Foundation investigations leading to the control of yellow fever, Dr. Kumm also has done extensive work in the study of modes of transmission of yaws and the control of malaria. During World War II he served as civilian consultant to the Surgeon General of the U.S. Army in Italy, directing field studies of the use of DDT against malarial mosquitoes in the marshes near Rome and Naples.

(Continued on page 74 of the advertising section)

## BOOK REVIEWS

DISORDERS OF THE CIRCULATORY  
SYSTEM

Edited by R. L. Craig. 301 pp. Illust. \$5.50.  
The Macmillan Company, New York, Toronto,  
1952.

The "Graduate Fortnight" devoted to the subject "Disorders of the Circulatory System", arranged by The New York Academy of Medicine, was an outstanding success. The reader has now the good fortune of being able to follow through this book the presentations of such men as Blumgart, Gofman, Szent-Györgyi, Dexter, Stead, Katz, Page, Duryee, Kossmann, and Hunter. Of the New York group, Paul Klemperer discusses "The Role of the Connective Tissue in Diseases of the Cardiovascular System", Kellner "Lipid Metabolism and Atherosclerosis", Levy "The Clinical Recognition of Coronary Heart Disease", Wylie and Humphreys II contribute to the discussion of cardiac surgery, William Dock describes the "The Mechanism and Management of Circulatory Failure". "Endocrine Factors in Hypertension" are dealt with by Perera, and surgery of arterial occlusion by Lord, Jr. Stewart Wolf concludes the series by a discussion of "Circulatory Responses to Life Situations". This record of the Graduate Fortnight will be of great interest to clinicians, research workers, and students.

BLOOD CLOTTING AND ALLIED  
PROBLEMS

Transactions of the Fifth Conference, January 21 and 22, 1952, New York, N.Y. Edited by J. E. Flynn, Associate Professor of Pathology, College of Physicians and Surgeons, Columbia University, New York. 368 pp. Illust. \$4.95. Josiah Macy, Jr. Foundation, New York 36, 1952.

During the last few years, a large volume of data has accumulated which has shed new light on the factors which play a part in the mechanism of normal and abnormal blood coagulation. The present "Transactions", now available in book form, again fulfill a very useful purpose in presenting a good deal of information which would otherwise be inaccessible as yet. The topics of discussion were: The Clinical Evaluation of the Newer Anti-coagulants, A Comparative Evaluation of Tromexan and Dicoumarol, New Clotting Factors, Defects in Haemostasis Produced by Whole Body Irradiation, Pathogenesis of Irradiation Haemorrhage, Antithromboplastin Activity of the Plasma of Animals Exposed to Ionizing Radiations, Fibrinolysin and Antifibrinolysin. Norway's Owren made a most valuable contribution which led to animated discussion of the various factors, which are now believed to play a part in blood coagulation. So many different laboratories have been investigating these factors independently in recent years, that it has become a necessity to attempt to establish the identity of the various factors reported by different workers. During this conference, a subcommittee was appointed for the purpose of arriving at some agreement regarding the identity of these various factors; it was concluded that the Labile Factor of Quick is identical with the Plasma Accelerator (Ac) Globulin of Ware, Guest and Seegers, and Proaccelerin (Factor V) of Owren. It was also agreed that mammalian plasma contains another factor of importance in the conversion of prothrombin to thrombin, viz. SPCA precursor of Alexander, which is identical with Factor VII of Koller, with Co-Thromboplastin of Mann, and with proconvertin (co-Factor V) of Owren. There are a number of other factors on which there is as yet no general agreement.

Undoubtedly, everyone interested in problems of blood coagulation will find a fund of useful information in these latest "Transactions".

### THE SCIENCE AND PRACTICE OF SURGERY

W. H. C. Romanis, *Senior Surgeon and Lecturer on Surgery, St. Thomas's Hospital, Surgeon to the Royal Masonic Hospital; and P. H. Mitchiner, Hon. Surgeon to H.M. The Queen, Vice-President, Royal College of Surgeons of England, Consulting Surgeon, St. Thomas's Hospital. Vol. I, 872 pp. Illust. 9th ed. \$6.50, Vol. II, 1019 pp. Illust. 9th ed. \$7.25. J. & A. Churchill Ltd., London; British Book Service (Canada) Ltd., Toronto, 1952.*

For the ninth time in a quarter century the two distinguished collaborators responsible for this favourite students' textbook have been forced by the pressure of new material to recast the book.

The antibiotics and the surgery of the chest and stomach supply the bulk of that which is new. The retention of so many of the old striking illustrations maintain the air of traditional authority. The perennial usefulness of the book seems assured.

### DISEASES OF THE NERVOUS SYSTEM

F. R. Ford, *Associate Professor of Neurology, The Johns Hopkins University, Baltimore, Maryland. 1181 pp. Illust. 3rd ed. \$22.25. Charles C. Thomas, Springfield, Illinois; The Ryerson Press, Toronto, 1952.*

This is the third edition of a volume that has already proven itself to be the most outstanding and comprehensive work on the subject. The first chapter deals with the examination of children and special diagnostic procedures. Perhaps more emphasis could have been placed on electroencephalography and angiography. The clinical aspects of the anatomy and physiology of the nervous systems is well presented. Then follows the complete presentation of the disease of the nervous system that occurs in children. A carefully selected bibliography at the end of each section gives the outstanding references to any one particular subject.

### PROGRESS IN NEUROLOGY AND PSYCHIATRY

*Edited by E. A. Spiegel, Professor and Head of the Department of Experimental Neurology, Temple University School of Medicine, Philadelphia, Pa. Vol. 7, 604 pp. \$12.00. Grune & Stratton, New York; The Ryerson Press, Toronto, 1952.*

This annual review, with its long list of distinguished contributors, suffers from the usual drawbacks of such compilations. Although the information is carefully selected from the current literature, the sections are of necessity too compressed to give, in some instances, a sufficiently full picture of the present situation. Too many topics have had to be dealt with in the available space.

In the section dealing with Clinical Neurology, a new chapter Paediatric Neurology has been included, and in the section of Clinical Psychiatry two distinguished Swedish psychiatrists have contributed a chapter on Genetics. Of the biennially reviewed subjects, this volume contains a chapter on Neurosyphilis in the section on Neurology and a chapter on Criminal Psychiatry in the section on Psychiatry.

There is no doubt that a thorough survey of the published literature has been made by men competent in their field. The advances made in the therapy of infectious diseases is reflected in the discussion of the use of antibiotics in infections of the nervous system, and the introduction of radioactive substances finds application in the diagnosis of brain tumours. In the field of psychiatry, not only the understanding, but also the further development, of electro-shock treatment, ultimately depends on the further study of the effect of various types

of currents upon the fundamental processes on which the excitation of the central nervous system depends; advances of the basic discipline, which have a bearing on this problem, have therefore been included in this volume. On the whole, the book provides a useful survey of recent developments and the lists of references guide the reader to the original sources in which he may be interested.

### MEDICAL DISORDERS DURING PREGNANCY

*Edited by S. Clayton and S. Oram. 341 pp. Illust. \$5.00. J. & A. Churchill Ltd., London; British Book Service (Canada) Ltd., Toronto, 1951.*

As pointed out by the authors it is becoming more difficult for obstetricians to keep abreast of recent advances in the diagnosis and treatment of the medical disorders that complicate pregnancy. In their book an attempt is made to overcome this discrepancy to some degree.

The early chapters are devoted to a preview of the maternal physiology in pregnancy. Although this material may be found in the usual obstetrical textbook it is adequately reviewed here and provides a useful background for the remainder of the book. In subsequent chapters subject matter dealt with includes heart disease, albuminuria, blood disorders, diabetes and other endocrine disorders, neurological disorders, psychiatric aspects, acute specific infective diseases, syphilis and disease of the skin, as each applies in the pregnant woman.

Each chapter deals with a new subject. Each is written in a manner similar to an article in a journal, with an introductory portion dealing with the physiological factors when present, differential diagnosis and so on and ending with a clear and concise summary. Although the book is small it consists of an excellent series of subjects which provide useful information for both the internist and obstetrician. It therefore is to be recommended as a useful addition to one's medical library.

### DIAGNOSTIC AND EXPERIMENTAL METHODS IN TUBERCULOSIS

H. S. Willis, *Superintendent and Medical Director, North Carolina Sanatoria McCain, North Carolina and M. M. Cummings, Director, Tuberculosis Research Laboratory, Lawson Veterans' Administration Hospital, Veterans' Administration, Chamblee, Georgia. 2nd ed. 373 pp. Illust. \$12.50. Charles C. Thomas, Springfield, Ill.; The Ryerson Press, Toronto, 1952.*

This is the second edition of this book which brings up to date in detail the diagnostic methods in tuberculosis. The book is divided into three parts—laboratory diagnosis, related clinical laboratory methods, and consideration of the methods in experimental tuberculosis. This is an excellent manual for diagnostic methods related to the identification of the tubercle bacillus. The material is well arranged and presented in a clear and concise manner which will make it a valuable asset to the medical student and the bacteriologist as well as to the general practitioner.

### RESEARCH IN ENDOCRINOLOGY

A. A. Werner and Associates. 285 pp. Illust. Edited by Al. R. Schmidt, City Editor, Belleville Daily Advocate, Belleville, Illinois, 1952.

This book, a scientific biography of Dr. Werner, represents his publications together with an evaluation of their importance in certain fields of endocrinology. Dr. Werner, who taught for more than 25 years at St. Louis University, was a pioneer in the clinical use of sex hormones. This small book may have limited appeal but it does represent the achievement of one man which makes interesting reading.



THE PATHOLOGY OF DIABETES  
MELLITUS

S. Warren, *Departments of Pathology of the New England Deaconess Hospital and the Harvard Medical School, Boston, Mass.* and P. M. LeCompte, *Departments of Pathology of the Faulkner Hospital and the Harvard Medical School, Boston, Mass.* 336 pp. 3rd ed. Illust. Thoroughly Revised. \$8.25. Lea & Febiger, Philadelphia; The Macmillan Company of Canada Limited, Toronto, 1952.

This volume requires no introduction to the medical profession. It is recognized as the outstanding work on the pathology of diabetes. The previous edition was published in 1938. In the interval a great deal of information had accumulated. This was the result of changing concepts, differential methods of study and extensive research of the pathological lesions in diabetes. For these reasons the new 3rd Edition will be welcomed.

This book is recommended to students, research workers, general practitioners and specialists in the various fields. It is unquestionably the finest work on the Pathology of Diabetes Mellitus.

TRANSACTIONS OF THE AMERICAN  
GOITER ASSOCIATION

1951 Annual Session, May 24, 25 and 26, Deshler-Wallick Hotel, Columbus, Ohio. 506 pp. Illust. \$15.00. Charles C. Thomas, Springfield, Ill.; The Ryerson Press, Toronto, 1952.

This book is made up of a series of papers which covers the important literature on thyroid disease up to 1951. Many aspects of this great problem are discussed and grouped in such a way that the book is easily read and can be used as an excellent reference. The problems covered are: (1) Iodine metabolism and the value of protein bound iodine and radio-active iodine uptake in the diagnosis of thyroid disease as well as an assessment of other tests used. (2) The treatment of uncomplicated thyrotoxicosis and those cases complicated by pregnancy and heart disease with a critical evaluation of the various methods of therapy, both medical and surgical. A new study on the effect of TSA on iodine decay is of interest. (3) Thyroiditis is reviewed with a fine paper on radio iodine studies that aid in our understanding of this problem. (4) Carcinoma and other tumours of the thyroid gland is given considerable space and the handling of this great problem is widely and critically reviewed. This section alone is of value for people interested in thyroid or malignant disease.

LOGAN TURNER'S DISEASE OF  
THE NOSE, THROAT AND EAR

Edited by D. Guthrie. 478 pp. Illust. \$8.00. 5th ed. John Wright & Sons Ltd., Bristol; The Macmillan Company of Canada Ltd., Toronto, 1952.

The name of Logan Turner is well-known to otolaryngologists of a decade or more ago. Because of the constantly changing field of medicine, various members of the specialty in Edinburgh have collaborated to bring forth a new edition of this classic, the first since 1940. As it is meant to be, it is an excellent book for students and general practitioners. It covers the field quite completely, without too great a wealth of detail—a fact of importance at that level of teaching. The methods of diagnosis and treatment have for the most part been brought fully up to date.

Criticism may be offered on three points. (1) More space might profitably be devoted to the important subject of allergy of the nose and sinuses. (2) In discussing the surgical treatment of Ménière's disease no mention is made of the well-established method of intra-cranial section of the vestibular portion of the eighth nerve. (3)

In discussing treatment of throat infections, antibiotic lozenges are advocated. No mention is made of the severe local allergic conditions that may be precipitated by this method of treatment.

Apart from these criticisms, this is a volume from which students and general practitioners will derive much benefit.

## PORTRAIT OF A HOSPITAL 1752-1948

W. Brockbank. 218 pp. Illust. \$5.00. Messrs. William Heinemann Medical Books Ltd., London; British Book Service (Canada) Ltd., Toronto, 1952.

The author has chosen a good title for his account of the Royal Infirmary in Manchester. Of all human institutions hospitals have histories which best can be made into "portraits". The Royal Infirmary began in the middle of the 18th century, just 200 years ago (the book commemorates its bicentenary). It was badly damaged by air raids in 1940, and in 1948 it ceased to be a voluntary hospital under the new régime. The author closes with the reflection that the Founders would have been proud if they could have seen the result of their labours, for the history of the Infirmary shows steady growth and the carrying on of treatment of the sick as well as of medical education. The details taken from the records of the hospital are full of interest to anyone who likes to look back on the changing conditions of hospital life.

## DISEASES OF THE NERVOUS SYSTEM

F. M. R. Walshe, *Fellow of the Royal College of Physicians of London; Fellow of University College, London.* 365 pp. Illust. 7th ed. \$4.60. E. & S. Livingstone Ltd., Edinburgh; The Macmillan Company of Canada Ltd., Toronto, 1952.

This book has for long been a favourite with medical students preparing for their final examinations. It does not claim to be a comprehensive manual of neurology but presents the subject in sufficient detail to be a useful source of information for students and practitioners. The present edition contains new material on demyelination, the etiology and pathology of disseminated sclerosis, encephalitis and encephalopathy, the association of immunizing inoculations with the appearance and site of paralysis in acute poliomyelitis, intracranial haematoma, epilepsy, and on various aspects of treatment. In spite of these changes the author has succeeded in keeping the present volume to the size of previous editions.

## CLINICAL ENDOCRINOLOGY

L. M. Hurxthal, *Head of the Department of Internal Medicine, Lahey Clinic, Boston;* and N. Musulin, *Staff of Cooper Hospital, Camden, N.J.* Vol. I and II, 1599 pp. Illust. \$24.00. J. B. Lippincott Co., Montreal, 1953.

This book adequately fulfills the purpose for which it was designed—a practical reference to endocrinology. It provides source material in outline form only and not in the usual narrative text form. It covers all the endocrine glands as well as related subjects such as hermaphroditism, sterility, dwarfism, obesity, metabolism and steroid compounds. The outline followed for each chapter generally consists of the preclinical and clinical parts, consideration being given to normal, decreased and increased functional states of each gland. Some of the chapters, the pituitary, thyroid, ovary and pancreas, appeared to the reviewer especially well done. The chapter on the adrenal seems unnecessarily brief. The photographs and charts are good and very appropriate. There are over nine thousand references and an excellent index.



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## HEALTH SABOTEURS

R. W. Davis, *Pageant Press*, 306 pp. \$4.50.  
*Burns & MacEachern, Toronto.*

The sub-title of this book might well be "No Compromise!" since it is a forthright, well documented venture into an ancient field of medical controversy. The saboteurs referred to in the title are the tonsils and the adenoids and Dr. Davis presents the case for their early removal in a very persuasive fashion. Have you ever felt sufficiently strongly on any question to spend several years writing a book about it and then have it published at your own expense? Dr. R. W. Davis is such a man. A professional lifetime spent in rural and urban practice in Canada has convinced him that infection and obstruction leave such a trail of lamentable sequelæ that the routine removal of tonsils and adenoid tissue by the age of two years would considerably benefit the health of our people.

Having stated his considered opinion, the author proceeds to justify it by reference to comparative biology and evolution, to clinical medicine and dentistry, to his own experience, and in the process develops a powerful indictment against these strategically placed little masses of lymphoid tissue.

This is an interesting book but it is evident that Dr. Davis was faced with the familiar writer's dilemma as to which audience to aim at, the scientific or the popular. He has resolved it by directing his remarks in the general direction of those whose decision it is whether Johnny will have a tonsillectomy—his parents and his family doctor. Although his recommendations are sweeping and even dogmatic, Dr. Davis emerges as no fanatic but as a sincere advocate of a preventive procedure which he argues with conviction. This would be a good book to have on the library shelf for circulation among patients who require to be persuaded that tonsillectomy is justified.

ROSE AND CARLESS' MANUAL  
OF SURGERY

Sir Cecil Wakeley, *Fellow of King's College, London, President of the Royal College of Surgeons of England, Senior Surgeon, King's College Hospital; Director of Surgical Studies and Lecturer in Surgery, King's College Hospital Medical School.* 1471 pp., illust. 18th ed. Vol. I and II. \$12.00 per set—Not sold separately. *Baillière, Tindall and Cox, London, W.C. 2; The Macmillan Company of Canada Ltd., Toronto, 1952.*

It is fifty-four years since the first edition of this work was published. Sir Cecil Wakeley has succeeded in bringing this edition adequately up to date. It remains as invaluable a text for today's students. There is a good deal of new material in this edition, while many chapters have been completely rewritten. Included are new useful sections on the Pathogenesis of Infections, Disorders of the Blood, Blood Transfusion, Hæmorrhage and

Shock, Biopsy in Surgery, Water and Salt Deficiency in Surgery, Chemotherapy, the Use of Physical Agencies in Surgery, Burns and their Treatment and Plastic Surgery.

The comprehensiveness of this edition is illustrated by sections on thyroid disorders, the uses of radio-iodine, thyroidectomy in myasthenia gravis, surgery of the heart and great vessels, pancreatectomy and management of intestinal obstruction. The chapter on Burns merits special mention. The chapter on the rectum and anus follows the teaching of the St. Mark's Hospital. Minor rectal conditions, which are so important to the practitioner, are covered in a lucid and thorough manner. The chapter on Amputations, based on experiences during the last war, is particularly useful.

There are many new illustrations and several coloured plates. This is an admirable textbook for the undergraduate, while the practitioner will find in it a most useful guide and reference work.

## THE CANADA YEAR BOOK 1952-53

*The official statistical annual of the resources, history, institutions, and social and economic conditions of Canada. Published by authority of The Right Honourable C. D. Howe, Minister of Trade and Commerce.* 1266 pp. \$3.00. *Queen's Printer and Controller of Stationery, Ottawa, 1953.*

Amongst the varied publications of the Dominion Bureau of Statistics none is as comprehensive as is the Year Book, including as it does an annual review of the resources, history, institutions and social and economic conditions of Canada. With the steady growth of the country there is of course an increasing amount of material to be dealt with each year, but articles on many subjects are not repeated but can be found in preceding volumes.

Particularly notable is the chapter on "The Development of Public Health, Welfare and Social Security in Canada" by Dr. G. F. Davidson, Deputy Minister of Welfare. This is an interesting account of the changes which have led to increasing assumption by the federal government of responsibilities originally borne entirely by provincial, and in some cases, municipal authorities. Now, federal expenditures in the fields of health, welfare and social security rank second only to expenditures for national defence. If all governments are included, federal, provincial and municipal, the expenditures in 1952, in health and social security, amounted to not less than 20% of the total amount spent in the year. The article goes on to give a most comprehensive picture of the provincial, municipal and various health and welfare organizations in Canada, with a final section on rehabilitation of veterans.

The book is not only indispensable for reference but provides interesting reading in general.

*lung infection?*

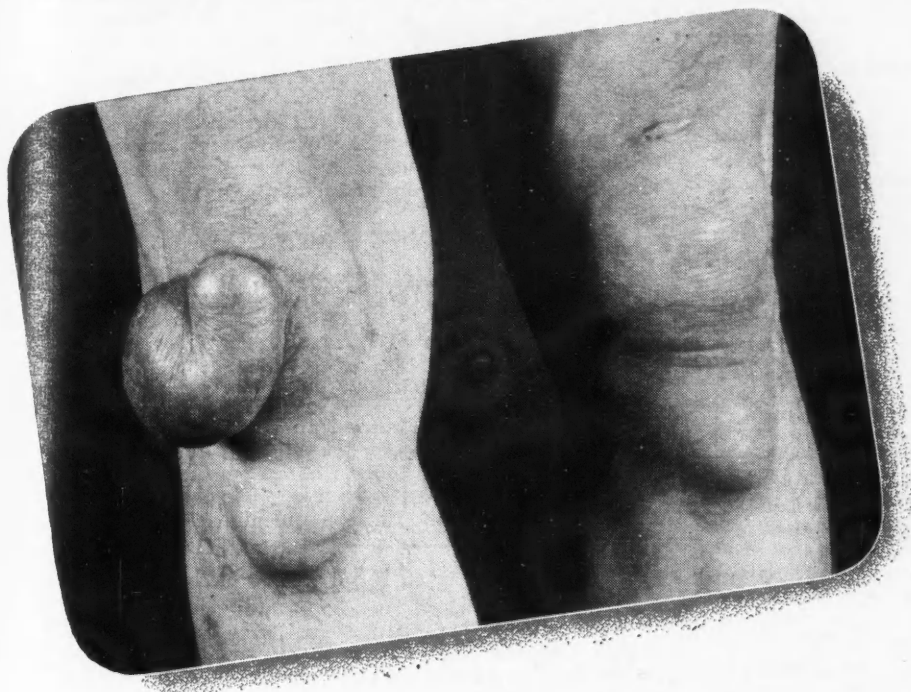
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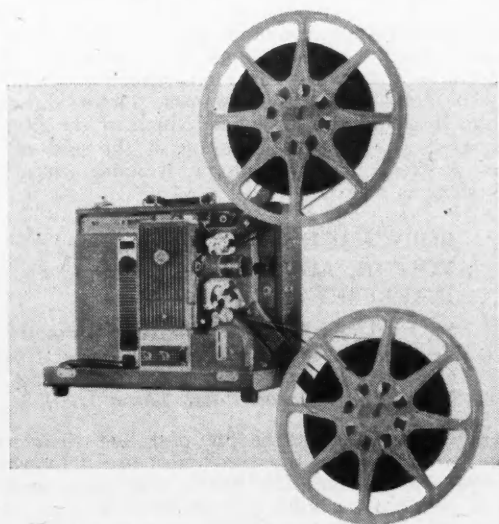
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### PROGRESS IN OPHTHALMOLOGY AND OTOLARYNGOLOGY

*Part one—Ophthalmology, Edited by M. Wiener and A. E. Maumenee. Part two—Otolaryngology, Edited by P. E. Ireland and J. A. Sullivan. 666 pp. Illust. \$18.00. Grune & Stratton, New York; Ryerson Press, Toronto, 1952.*

Part I of this publication deals with progress in Ophthalmology. It is intended as a successor to "Ophthalmology in the war years", a review of the literature from 1940 to 1946, and as such is a review of the ophthalmological literature from 1946 to date. It presents in very readable and not too condensed form, a complete review of all aspects of ophthalmology from basic sciences, through diseases of the eye and newer techniques in ocular surgery and anaesthesia. Excellent chapters are devoted to newer drugs in the treatment of glaucoma, as well as the place of anti-biotics and cortisone in the therapy of ocular conditions.

Part II of the text deals with progress in Otolaryngology. This is acknowledgedly not a complete review of all aspects of Otolaryngology. In the foreword, Dr. P. E. Ireland briefly discusses three conditions not covered in the main text, viz.: Broncho-oesophagology, Maxillo-facial surgery and non-malignant laryngeal lesions. The remainder of the field has been very adequately covered by a series of reviewers. One chapter in particular "The Modern Conception of Headache" is well worth the perusal of anyone practising medicine.

In general, much sound knowledge is to be found in this text which has not as yet been incorporated in the standard textbooks of Ophthalmology and Otolaryngology. One wonders, however, if, because of the steadily advancing division of the text if it too were divided into two separate volumes of Ophthalmology and Otolaryngology in later editions.

### TUBERCULOSIS IN THE COMMONWEALTH

*The full verbatim transactions of the Third Commonwealth Health and Tuberculosis Conference, held in London from the 8th to the 14th of July, 1952. 443 pp. Illust. 21 shillings. National Association for the Prevention of Tuberculosis, London W.C. 1, England, 1952.*

At this conference the following subjects were discussed: Tuberculosis, a problem for all peoples: Domiciliary management of the open respiration case and of the minimal lesion; Procedure at Chest Clinics and liaison with the family doctor; Prevention and care work by Local Health Authorities and other social problems; Contemporary ideas in the management of the tuberculous patient; Tuberculosis in the British Colonial Territories; Known respiratory tuberculosis as a clinical administrative problem; Child-bearing and tuberculosis; Recent methods in laboratory technique; Modern technique in the diagnosis of tuberculosis; Mediastinal abnormalities. Of these tuberculosis and pregnancy, case finding, and the management of tuberculous patients seem to be the most informative.

At Black Notely, Essex, England, Cohen after personally supervising the treatment of over 420 pregnant tuberculous women considers that pregnancy, labour and the puerperium have no effect on the cause of pulmonary tuberculosis, and this is the conclusion of other speakers. The added strain of caring for the child later is the greatest danger. In case finding in pulmonary tuberculosis, the importance of the family physician was stressed whereby mass x-ray survey at Chest Clinics of specific groups of people referred by the family doctor may be carried out. The discussion of the use of Isoniazid in tuberculosis demonstrated its high degree of activity in miliary tuberculosis in particular, but stressed that evidence is accumulating that the tubercle

bacillus develops Isoniazid resistance early when the drug is administered alone.

In conclusion it may be stated from this conference that the major problem in the treatment of tuberculosis throughout the Commonwealth is the shortage of nursing personnel trained in tuberculosis work.

### CONNECTIVE TISSUES

*Transactions of the Second Conference May 24-25, New York, N.Y. C. Ragan, Department of Medicine, College of Physicians and Surgeons, Columbia University, New York. 190 pp. Illust. \$3.50. Josiah Macy, Jr. Foundation, New York, 1951.*

This volume deals with current problems and thought in the study of the function of ground substance, the chemical morphology of elastic fibres, pain in connective tissue, collagenfibre genesis in tissue culture, and the regression of scar tissue in experimental cirrhosis. The problems are of fundamental research importance but, with the exception of the section on pain, are of little immediate interest to physicians and surgeons in general. On the other hand, the book is highly recommended to those whose investigations are even remotely concerned with the connective tissues.

The work reported, while not all new, is of high quality. It is presented briefly, is well documented and is unusually well illustrated. The readers' interest is continually stimulated by the completely informal manner in which discussion is recorded. Indeed, almost one-half of the transactions consists of the discussion that took place among the 25 experts who were members of the conference. That their varied comments are not invariably expert only contributes to the pleasure of reading this small book.

### CLINICAL ALLERGY

*F. K. Hansel, Director, Hansel Foundation for Education and Research in Allergy; Chief of Allergy Service, DePaul Hospital, St. Louis. 1005 pp. Illust. \$17.50. The C. V. Mosby Company, St. Louis; MacAinsh & Co. Ltd., Toronto, 1953.*

This volume "presented as a complete text on the subject of general allergy" provides interesting reading for those already trained in the field. For the general practitioner as well as the beginner in allergy some controversial material is presented as accepted fact. For example: "recent investigations have shown that the antihistamine drugs are far more effective than those previously employed". Psychosomatic factors in allergy are quite inadequately discussed. Much of the literature is discussed and the bibliography at the end of each chapter is excellent. The volume is more useful as a review than as a text.

### RORSCHACH'S TEST. VOL. III, ADVANCES IN INTERPRETATION

*S. J. Beck, Institute for Psychosomatic and Psychiatric Research, Michael Reese Hospital, Chicago. 301 pp. \$6.50. Grune & Stratton, New York; The Ryerson Press, Toronto, 1952.*

The author's experiences of the past five years in the interpretive use of the Rorschach test are demonstrated by the present volume. The use of clinical methods has made it possible to build up quantitative data, which were unavailable for the Rorschach test before. Quantitatively, there are many observations which occur with sufficient frequency in the use of the Rorschach test, to give them sufficient validity; they carry the pitfall of any qualitative judgment with them, that is, they become subjective. Their value will therefore vary directly with each examiner's ability to set up his operational definitions, and to refer each qualitative judgment

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## Recent References:

Stats, D., and Neuhof, H.: Am. J. Med. Sci., 1947, 214: 159.  
Walker, J.: Surgery, 1945, 17: 54.  
Cosgriff, S. W., Cross, R. J., and Habib, D. V.: Surgical Clinics  
of North America, 1948, 324.  
De Takats, G.: J.A.M.A., 1950, 142: 527.



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E. B. Strauss, Physician for Psychological  
Medicine, St. Bartholomew's Hospital; Lecturer  
in Psychological Medicine, St. Bartholomew's  
Hospital. 55 pp. Price 8/6d. net. H. K. Lewis &  
Co. Ltd., London, W.C. 1, 1953.

Dichotomous thinking is the greatest single barrier to  
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he expresses the bewilderment that the medical profes-  
sion must feel about a specialty divided into warring  
camps, each claiming a fanatical autonomy. He points  
out that no psychological school is sacrosanct, that we  
have something to learn from each. He deplores the  
comparative neglect of Jung. In the failure to think out  
the problem of causality in rational terms, Dr. Strauss  
finds further grounds for unreason, and to explain this  
he leads the reader through a lucid exposition of neo-  
Aristotelean philosophy and logic.

In his last address, he expresses the resentment felt  
by all non-prejudiced psychiatrists at an exclusively  
Pavlovian approach in the U.S.S.R., and at one that  
tends to be exclusively psycho-analytical in North  
America. This address might well be sub-titled "A  
Counter-blast to Psycho-analytical Dogma", and in it  
some of the ingenious speculations of Freud are made  
to look very naive indeed. While recognizing the great  
debt that psychiatry owes to Freud, Dr. Strauss scath-  
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## Books Received

Books are acknowledged as received, but in some cases reviews will also be made in later issues.

**Chronic Alcoholism and Alcohol Addiction.** R. J. Gibbins, Member of the Department of Psychology, Queen's University, Kingston, Ontario. 57 pp. \$1.50. The Alcoholism Research Foundation, Toronto, 1953.

**An Atlas of Surgical Exposures of the Extremities.** S. W. Banks, Associate Professor of Orthopaedic Surgery, Northwestern University Medical School; and H. Laufman, Associate Professor of Surgery and Director of Experimental Surgery, Northwestern University Medical School. 391 pp., illust. \$15.00. W. B. Saunders Co., Philadelphia; MacAinsh & Co., Ltd., Toronto, 1953.

**The Management of Abdominal Operations.** Edited by R. Malugot. 1253 pp., illust. \$24.00. The Macmillan Co. of Canada Ltd., Toronto, 1953.

**Dermatology—Essentials of Diagnosis and Treatment.** M. B. Sulzberger, Professor and Chairman, Department of Dermatology and Syphilology, New York University Post-Graduate Medical School; and J. Wolf, Associate Professor of Clinical Dermatology and Syphilology, New York University Post-Graduate Medical School. 592 pp., illust. Revised edition. \$10.00. The Year Book Publishers Inc., Chicago; Burns & MacEachern, Toronto, 1952.

**The Pharynx—Basic Aspects and Clinical Problems.** Edited by A. R. Hollender, Professor of Otolaryngology, Emeritus, University of Illinois College of Medicine; Attending Otolaryngologist and Chairman of the Service, Mount Sinai Hospital of Greater Miami. 560 pp., illust. \$15.00. The Year Book Publishers Inc., Chicago; Burns & MacEachern, Toronto, 1953.

**Diagnostic Test in Neurology.** R. Wartenberg. 228 pp., illust. \$4.50. The Year Book Publishers, Inc., Chicago; Burns & MacEachern, Toronto, 1953.

**Emergency Surgery.** H. Bailey, Emeritus Surgeon, Royal Northern Hospital, London; Senior Surgeon, St. Vincent's Clinic. 963 pp., illust., 6th ed. \$20.00. John Wright & Sons Ltd., Bristol; The Macmillan Co. of Canada Ltd., Toronto, 1953.

**Operative Neurosurgery.** E. S. Gurjian, Professor of Neurosurgery, Wayne University College of Medicine; and J. E. Webster, Assistant Professor of Surgery, Wayne University College of Medicine. 422 pp., illust. \$10.00. The Williams & Wilkins Co., Baltimore; Burns & MacEachern, Toronto, 1952.

**Hypnosis in Medicine.** A. Ph. Magonet, President Medical Hypnosis Association. 104 pp. \$2.25. William Heinemann Medical Books Ltd., London; British Book Service (Canada) Ltd., Toronto, 1952.

**Surgical Applied Anatomy.** Sir F. Treves, Revised by L. C. Rogers, Professor of Surgery, University of Wales; Director of Surgical Unit, Cardiff Royal Infirmary. 590 pp., illust., 12th ed. \$4.25. Cassell & Co., Ltd., London; British Book Service (Canada) Ltd., Toronto, 1952.

**Visceral Circulation—A Ciba Foundation Symposium.** Edited by G. E. W. Wolstenholme. 278 pp., illust. \$6.00. J. & A. Churchill Ltd., London; British Book Service (Canada) Ltd., Toronto, 1952.

**The Essentials of Medical Diagnosis.** Rt. Hon. Lord Horder, Extra Physician to H.M. the King; and A. E. Gow, Honorary Physician to Household, H.R.H. the Duchess of Kent. 462 pp., illust., 2nd ed. \$4.50. Cassell & Co., Ltd., London; British Book Service (Canada) Ltd., Toronto, 1952.

**Recent Advances in Anaesthesia and Analgesia.** C. L. Hewer, Senior Anaesthetist, St. Bartholomew's Hospital, St. Andrew's Hospital. 440 pp., illust., 7th ed. \$6.00. J. & A. Churchill Ltd., London; British Book Service (Canada) Ltd., Toronto, 1953.

**Recent Advances in Obstetrics and Gynaecology.** A. W. Bourne, Consulting Gynaecologist to St. Mary's Hospital; and L. H. Williams, Gynaecologist to St. Mary's Hospital and Surgeon to the Samaritan Hospital for Women. 339 pp., illust., 8th ed. \$5.50. J. & A. Churchill Ltd., London; British Book Service (Canada) Ltd., Toronto, 1953.

**Synopsis of Tropical Medicine.** Sir Ph. H. Manson-Bahr, Past President of the Royal Society of Tropical Medicine and Hygiene, London and the Medical Society of London; Consulting Physician to the Hospital for Tropical Diseases, London, the Albert Dock Hospital and Tilbury Hospital. 248 pp., illust., 2nd ed. \$3.50. Cassell & Co., Ltd., London; British Book Service (Canada) Ltd., Toronto, 1952.

**Hale-White's Materia Medica, Pharmacology and Therapeutics.** A. H. Douthwaite, Physician to Guy's Hospital; Senior Censor, Royal College of Physicians of London. 512 pp., 29th ed. \$4.25. J. & A. Churchill Ltd., London; British Book Service (Canada) Ltd., Toronto, 1952.

**Textbook of Paediatrics.** Edited by W. R. F. Collis, Lecturer in Paediatrics, Dublin University; Physician, National Children's Hospital. 1104 pp., illust. \$29.50. William Heinemann Medical Books Ltd., London; British Book Service (Canada) Ltd., Toronto, 1952.

**Sandoz Atlas of Haematology.** Published by Sandoz Ltd., Basle, Switzerland. 91 pp., illust. \$5.00. Sandoz Pharmaceuticals, Division of Sandoz (Canada) Ltd., 236 St. Paul Street W., Montreal 1, Que.

(Continued on page 88)

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**References:** in the case of a journal arrange as follows: author (JONES, A. B.), title, journal, volume, page, year. In the case of a book: WILSON, A., Practice of Medicine, Macmillan, London, 1st ed., p. 120, 1922.

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**POSITION WANTED.**—Certified general surgeon, 41, desires to join a group or senior surgeon with a view to partnership. Experience in surgical and general work. Willing to do general practice, besides surgery, if necessary. Testimonials available. Reply to Box 694, Canadian Medical Association Journal, 3640 University Street, Montreal, Que.

**POSITION WANTED.**—Obstetrician-gynecologist, 34 years. L.M.C.C., M.R.C.O.G., F.R.C.S.(C) eligible, presently professor and chairman busy department of obstetrics and gynecology in large American overseas university (teaching, publications and large private practice) desires association with older man or group in busy practice. Available interview early October and early December this year in Canada. Returning Canada permanently June 1954. Outside interests pediatrics and surgery. Excellent references Canada and here. Bilingual. Reply to Box 712, Canadian Medical Association Journal, 3640 University Street, Montreal, Que.

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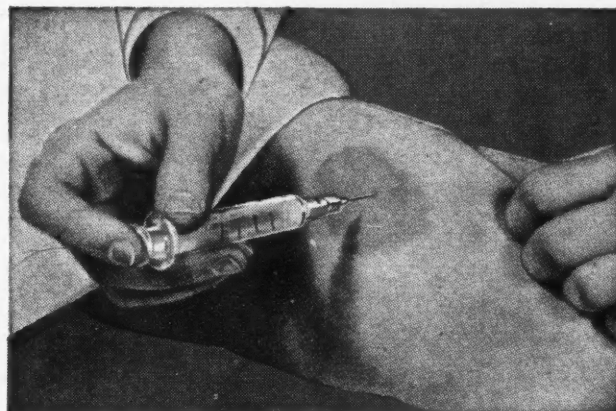
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Continued on page 36

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1. Brown, E. M., Frain, J. B., Udell, L., and Hollander, J. L.: Paper presented at Annual Meeting, American Rheumatism Association, Chicago, Ill., June 6, 1952.

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### GENERAL NEWS

"It is a pleasure to note that at the annual dinner of the British Medical Association held in the Town Hall at Portsmouth on July 26, Dr. A. D. Blackader, Editor of the *Journal*, was one of two who replied to the toast of the guests. His remarks are quoted in the *Brit. M. J. Supplement* of August 4. Speaking unofficially he said he would like to see the Canadian Medical Association affiliated with the British Medical Association but pointed out at the same time the difficulties in Canada with its scattered population as compared with a tight little community like England, of building up a strong national association. He must leave, he said, to the Secretary of the Canadian Medical Association to give the proper answer to the invitation from England to hold a Canadian Medical Association Meeting in that country. As a private member of the Canadian Association he desired to say that the proposed meeting would be received with the most sympathetic consideration. He would like to see at any rate, an exchange of delegates at the respective meetings of the two Associations. 'In Canada', he remarked, 'they looked to the Imperial Association with a great deal of respect and filial feeling, and any proposals for closer—even though sentimental—union would have their very careful consideration'."

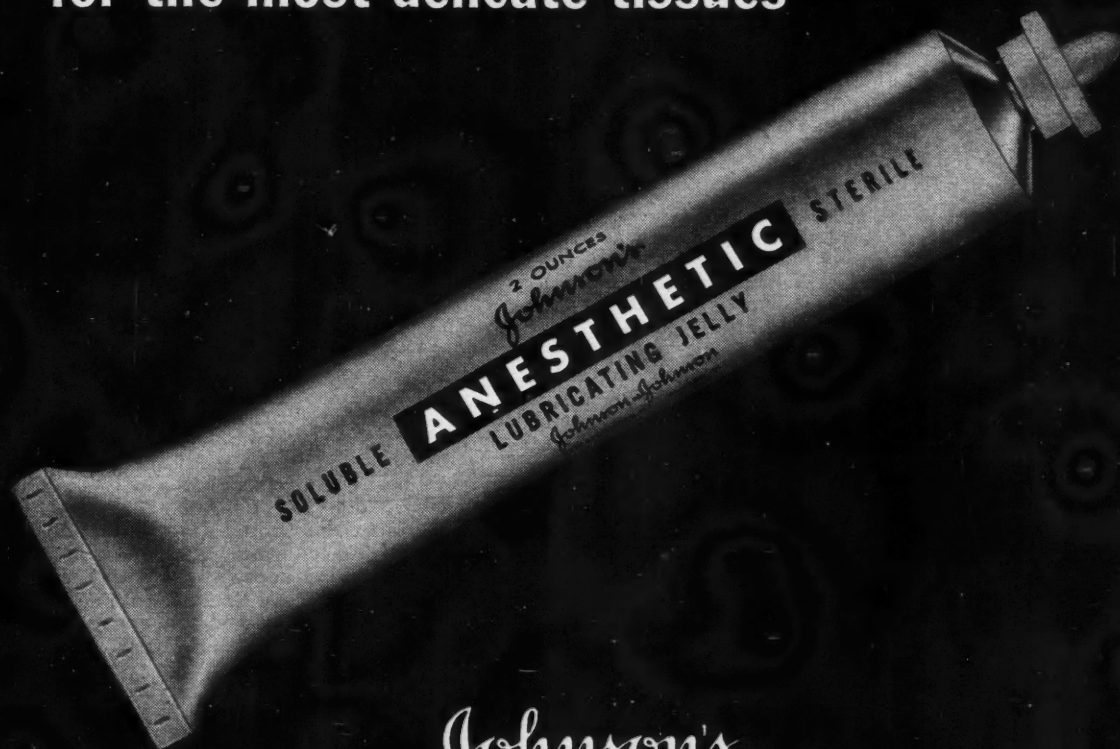
### NEWS ITEMS—Quebec

"Sir Henry Gray of Aberdeen, recently appointed Surgeon-in-Chief of the Royal Victoria Hospital, has arrived to take up his duties. He was the guest of honour the other day at a dinner given by the Kiwanis Club of Montreal. Dr. George E. Armstrong spoke of the excellent work Sir Henry Gray had already done in the practice of civil and military surgery and wished him every success in Montreal. The Rev. Father McShane and the Rev. Dr. Frank Charters on behalf of the clergy, Alderman Gareau on behalf of the City of Montreal, Colonel Alexander a representative of the military district, and Mr. Henry Elliott, K.C., on behalf of the legal profession, welcomed Sir Henry Gray to Montreal. In reply Sir Henry Gray thanked the previous speakers and spoke of the responsibilities and ideals of the surgeon."

### EDITORIAL—Canadian Physiologists at British Conventions

Canada may well be proud of the position which representatives of her scientific research were given both at the International Physiological Congress in Edinburgh, and in the Section of Medicine at the annual meeting of the British Medical Association at Portsmouth. At the Physiological Congress the members who, as the *British Medical Journal* states, are more accustomed to lecture than to listen to lectures, did Professor Macleod of Toronto, the honour to give up the first session entirely to his story of the early attempts to obtain the hormone of the pancreas, and to a modest presentation of how Dr. Banting and collaborators in his laboratory finally succeeded in obtaining it. He described how Dr. Banting had taken advantage of the old observation that obstruction of the ducts of the pancreas was followed by degeneration of the cells of the acini by which the pancreatic juice is secreted, while the islets of Langerhans remained little affected. Physiologists had long been confident that the pancreas did produce a hormone; the difficulty was in obtaining it, for when an extract of the whole pancreas was made the hormone was destroyed by the trypsin-producing cells. It was to the enduring credit of Banting that by experiments of a different type from those of his predecessors he first obtained evidence of its existence and finally was able to obtain it in a comparatively pure state.

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## NEWS AND NOTES

(Continued from page 460)

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The Sir Charles Hastings Clinical Prize Essay Competition was established by the B.M.A. for the promotion of systemic observation, research, and record in general practice. The competition has been extended by the addition of a second prize known as the Charles Oliver Hawthorne Clinical Prize. The following are the regulations governing the awards.

1. The Sir Charles Hastings Clinical Prize, consisting of a certificate and 50 guineas, will be awarded for the best essay submitted.

2. The Charles Oliver Hawthorne Clinical Prize, consisting of a certificate and 40 guineas, will be awarded for the second best essay submitted.

3. Any member of the Association who is engaged in general practice is eligible to compete for these prizes.

4. The work submitted must include personal observations and experience collected by the candidate in general practice, and a high order of excellence will be required. If no essay entered is of sufficient merit no award will be made. Candidates in their entries should confine their attention to their own observations in practice rather than to comments on previously published work on the subject, though reference to current literature should not be omitted when it bears directly on their results, their interpretations, and their conclusions.

5. Essays, or whatever form the candidate desires his work to take, must be sent to the Secretary, British Medical Association, B.M.A. House, Tavistock Square, London, W.C.1, not later than December 31, 1953.

A prizewinner in any year is eligible for an award of either of the prizes in any subsequent year. A study or essay that has been published in the medical press or elsewhere will not be considered eligible for a prize, and a contribution offered in one year cannot be accepted in any subsequent year unless it includes evidence of further work. If any question arises in reference to the eligibility of the candidate or the admissibility of his or her essay the decision of the Council on any such point shall be final. Preliminary notice of entry for this competition is required, on a form of application to be obtained from the Secretary.

Each essay, which should be unsigned, must be typewritten or printed and accompanied by a note of the candidate's name and address. No definite limits are laid down as to the length of essays, but the Council anticipates that for this Competition essays should consist of between 3,000 and 10,000 words.

SAINT VINCENT PRIZE FOR  
MEDICAL SCIENCES

The Academy of Medicine of Turin announces a competition for the first Saint Vincent Prize for Medical Sciences of Lit. 7,500,000 founded by the Regional Administration of the Valley of Aosta and by the SITAV of Saint Vincent for the purpose of promoting the development of scientific researches in the medical field. The conditions are the following: (1) The prize will be granted for an essay, or group of essays, printed, dealing with a single subject matter related to a medical branch and such as to represent a noteworthy progress in the knowledge of the investigated matter. Said essays must have been published after 1950 and must reach the Academy of Medicine in Turin—Via Po, 18—not later than December 31, 1953. (2) The essays must have been published in one of the following languages: Italian, Latin, French, English, Spanish, Portuguese, German or Russian. (3) The essays must be forwarded to the Academy by registered letter, in five copies, two of which shall remain the property of the Academy. (4) The competitors are requested to enclose with their essays a summary in Italian or French concerning the substance as well as the original and concluding parts of the subject matter. (5) The proclamation of the winner shall take place at Saint Vincent, Valley of Aost, in June 1954 at a meeting sponsored by the Academy of Medicine and on a day to be prefixed.

The Hospital for Sick Children, Toronto, is carrying out extensive research into the use of the newer antibiotics and ways of preventing the development of resistance to them. The development of bacteria resistant to the antibiotics has been a matter of concern to the medical profession for some time. A large amount of information has been accumulated on the subject, but some of it has been hastily compiled and is only partly complete. Much time-consuming work remains to be done, preferably in a hospital where laboratory and clinical tests can be worked out together.

At the Hospital for Sick Children, a special research group has been set up in the clinical bacteriology laboratories under the direction of Dr. T. E. Roy, director of bacteriology. This team is attempting to assess the reliability and accuracy of various laboratory methods of determining the sensitivity of common bacteria to antibiotics. The researchers are also planning to study antibiotics, particularly the newer ones, to determine the best possible dosage and to find out how they are absorbed and distributed. This information will be correlated with the laboratory's sensitivity studies and the results of clinical trials. A federal grant will help to meet the cost of supplies for the laboratory work and assists with the salaries of four full-time research workers.

MARKLE FUND TO CONTINUE  
MEDICAL SCHOOL FACULTY GRANTS

The John and Mary R. Markle Foundation will continue for a seventh year the Scholar in Medical Science program to help scientists on medical school faculties to become established as teachers and investigators in their chosen fields. A total of 111 Scholars on the staffs of 55 medical schools in the United States and Canada have been aided by these grants since the program began in 1948. Twenty-one were appointed in 1953. The number to be named in 1954 has not been determined.

Each medical school is invited to nominate one faculty member as a candidate for the five-year, \$30,000 grant. For support of each Scholar selected, the medical school receives an annual grant of \$6,000 for the term of the appointment. All nominations should be in the Foundation offices on or before December 1, 1953. A booklet giving further information will be sent on request by the Foundation, 14 Wall Street, New York 5.

STUDY OF CRIPPLING CONDITIONS  
AMONG CHILDREN

The Hospital for Sick Children, Toronto, is undertaking a long-term study of crippling conditions affecting children's joints, with a federal grant to support the research. The study, to be supervised by Dr. R. M. Wansbrough, director of surgery for the hospital, will concentrate on finding the causes of the various crippling conditions and a review of treatment methods in an effort to develop better treatment procedures.

The Hospital for Sick Children has noted a marked increase over the past few years in the number of cases of crippling conditions of the hip and elbow joints, but the causes of many of these conditions have not been determined. A disability causing major concern is congenital dislocation of the hip. This has been shown to be inherited, to occur more frequently in girls than in boys, to affect the left hip more frequently than the right, and to vary according to the individual's racial extraction. If diagnosed in the newborn, this condition can often be successfully treated, but if treatment is not begun before the child is seven years old, permanent disability may result.

Few changes in the treatment of congenital dislocated hips have been made in the past 20 years, and one purpose of the Toronto study is to review treatment procedures, to try to work out improved methods and to press for early treatment of this disability. The genetic studies will be supervised by Dr. Norma Ford Walker, head of the Sick Children's department of genetics, and the x-ray examinations will be performed by the hospital's x-ray staff under the direction of the head of the x-ray department, Dr. J. Munn.

(Continued on page 76 of the advertising section)



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## NEWS AND NOTES

*(Continued from page 74 of the advertising section)*AMYOTROPHIC LATERAL  
SCLEROSIS STUDY

A major study of amyotrophic lateral sclerosis has just been initiated on Guam, Dr. Leonard A. Scheele, Surgeon General of the Public Health Service, Department of Health, Education, and Welfare, and Rear Admiral Lamont Pugh, Surgeon General of the Navy, announced jointly. This investigation, in which the Public Health Service, the Navy Bureau of Medicine and Surgery, and the Department of Interior are participating, will be headed by Dr. Leonard T. Kurland, Chief Epidemiologist of the Public Health Service's National Institute of Neurological Diseases and Blindness, who left for Guam this month.

Dr. Pearce Bailey, Director of the National Institute of Neurological Diseases and Blindness, in commenting on why the Pacific island was chosen as a site for this study, said that information now available indicates that this crippling fatal disease is highly prevalent on Guam. The chances for determining the possible rôles of heredity and environment in the development of amyotrophic lateral sclerosis are especially good on Guam because of the relatively fixed population. Additional evidence from the literature, indicates that *lytico* (for paralytico), as it is known by the natives, has been prevalent in Guam for generations. The most recent report is by Donald R. Koerner of Rochester, New York, who collected data while serving as a Navy physician on Guam.

Dr. Kurland, Dr. Donald Mulder, U.S. Navy, and Drs. K. K. Waering and S. Tillema of the Government of Guam will co-operate in the present study, which will go on for approximately two months. They intend to determine just whether it is as prevalent on Guam as believed, if it is exactly similar to the disorder as it is known elsewhere, and finally, just what the possible causes may be—whether genetic, traumatic, infectious, economic, nutritional or others.

To obtain this data, the research team will examine several groups of natives in addition to those presently affected with a.l.s. By investigating the siblings of those affected, they hope to determine why one member of the family has incurred the disorder, the other not. Examination of a random group of natives on Guam without a.l.s. may also help isolate the special conditions which may be responsible for the disease. Finally, the research team will study the natives on a neighboring island in order to determine if the problem of a.l.s. is typical for Guam alone or for other areas in the Marianas as well.

STUDY UNDERTAKEN TO FIND WAYS  
OF REDUCING INFANT DEATHS

A five-year investigation into the causes of stillbirths and of the deaths of infants at or shortly after birth is being begun this year in Toronto as a step toward reducing the toll of infant lives in Canada. The maternal death rate in Canada has dropped substantially over the past 20 years until it now stands at one or less per 1,000 live births. However, the death rate from stillbirths has changed little in 50 years, and the combined rate for stillbirths and deaths at or shortly after birth has not dropped much in 20 years.

Research conducted at the Toronto Western Hospital in 1947 brought out several promising methods of investigation and education, and these will be followed up to determine the cause and, if possible, to suggest methods of reducing stillbirths and infant deaths. This study, co-ordinated by Dr. D. E. Cannell, professor and head of the department of obstetrics and gynaecology of the University of Toronto, will be carried out by an obstetrical specialist with the co-operation of the obstetrical departments of the major Toronto hospitals and the related departments of the Faculty of Medicine. It will also be co-ordinated with research being pursued by paediatric specialists at the Hospital for Sick Children, Toronto.

## EMPIRE MEDICAL ADVISORY BUREAU

Any Canadian medical men who are thinking of visiting the United Kingdom should get in touch with Dr. H. A. Sandiford, Medical Director of the Bureau at B.M.A. House, Tavistock Square, London, W.C. 1, so that all the facilities of the Bureau will be placed at their disposal.

Medical men will find the Bureau helpful in arranging accommodation, as well as postgraduate courses of study. They will also receive a warm welcome and help in many small ways.

A United States Government gift to date of 35,000,000 pounds of surplus milk powder to non-profit CARE for distribution to various countries in Europe, Asia and South America, was announced at the seventh annual CARE conference held this year in Panama. The milk powder is to be distributed by CARE to needy people in Yugoslavia, India, Pakistan, France, Italy, Greece, Korea, Germany, Bolivia, Ecuador and Chile. CARE observers have been assigned to the various countries to insure proper distribution and also to make known to the recipients that the milk is a gift from the American people.

Governments of countries where contracts are signed for distribution will pay nothing for the milk but cover costs of shipment from the United States and the costs of distribution.

## PIN-INDEX SAFETY SYSTEM

There is no margin for mistakes that cost human lives. Acting on this principle, a group of manufacturers, military men and industrial researchers have drawn up an American Standard for eliminating one unpredictable hazard of hospital operation. The standard is a safety code covering the use of medical gases. It prevents the accidental switching of gas containers on anaesthetic machines and is infallible where human judgment is not.

The new safety code, developed under the leadership of a committee of the Compressed Gas Association, is made up of some 40 representatives of manufacturing companies, technical societies, and the armed services. J. J. Crowe, of New York City is chairman. The committee developed the standard in co-operation with the American Hospital Association and the Association of Anaesthesiologists. It was tested this spring in a number of large hospitals.

The safety code is called the Pin-Index Safety System. It forms an important addition to the 56-page American Standard B57.1, Compressed Gas Cylinder Valve, Outlet and Inlet Connections, which has just been published in its newly revised form by the American Standards Association. In this system, two pins are placed on the yoke connections of medical gas cylinders, each pin being in a different position for each type of gas. Two holes are placed in a corresponding position in the valve connection of the gas cylinder. Since there is only one combination of pins and holes for each gas, it is impossible to use the wrong gas. If the wrong cylinder valve is tried, the holes and pins will not match and the two parts will not fit together. A similar system further insures the patient's safety by making certain that the cylinder corresponds with the type of gas with which it is being filled.

Hospitals are rapidly adopting the new system because they can easily convert their existing anaesthetic equipment without waiting for replacement with new, up-to-date equipment. A yoke adapter fitted with the appropriate pins slips on to the yoke of the gas machine. The new standard will be used internationally. It has been approved by the Canadian Standards Association and has been accepted by British industry and medical circles.

*(Continued on page 78 of the advertising section)*



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Bottles of 100 and 500



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## NEWS AND NOTES

*(Continued from page 76 of the advertising section)*

## ANNUAL PRIZE ESSAY CONTEST

The American Dermatological Association is again offering a series of prizes for the best essays submitted for original work, not previously published, relative to some fundamental aspect of dermatology or syphilology. The purpose of this contest is to stimulate investigators to original work in these fields. Cash prizes will be awarded as follows: Five hundred dollars, three hundred dollars and two hundred dollars for first, second and third place, respectively.

Manuscripts typed in English with double spacing and ample margins as for publication, together with illustrations, charts, and tables, all of which must be in triplicate, are to be submitted not later than December 1, 1953. The manuscripts should be sent to Dr. J. Lamar Callaway, Secretary, American Dermatological Association, Duke Hospital, Durham, North Carolina. Those which are incomplete in any of the above respects will not be considered.

The next annual meeting of the American Dermatological Association will be held April 13-17, 1954, at The Greenbrier Hotel, White Sulphur Springs, West Virginia.

## GENERAL PRACTICE LECTURES

How can a society "sell" medical students on practice in rural areas or small communities? For the second year the Ohio State Medical Association's Committee on Rural Health has held a series of orientation lectures designed to acquaint senior medical students at Ohio State University with general medicine as it is practiced in rural areas and small towns. The committee feels that "if medical students are given a candid picture of rural general practice, with both advantages and disadvantages of life in rural areas, more medical graduates will consider this type of life following graduation from medical school and internship."

Wives and children came along, too, to the series of 5 lectures on such subjects as selecting the place to practise, types of practice encountered, hospital connections and emergencies, the economics of a rural practice and the physician and his community. Three members of the Ohio State Medical Association's Committee on Rural Health, all practising in rural or small communities, served as lecturers. The lecture program was presented with the co-operation of the Ohio State University College of Medicine, the Senior Class Cabinet and the Student American Medical Association. Really practical demonstrations also were given, showing what to carry in a first-aid bag, obstetrics bag and bag for handling general medical cases. The lecture on rural practice economics touched upon such subjects as setting up practice, how to get housing, securing necessary equipment, income, fees, expenses, use of time, and so forth.

## SECOND INTERNATIONAL CONGRESS OF CARDIOLOGY

Membership in the Second International Congress of Cardiology, which will be held in Washington, D.C., September 12 through 15, 1954, will be open to all members of affiliated national cardiological societies and associations throughout the world, according to an announcement by L. Whittington Gorham, M.D., Secretary-General. Membership will also be open to other physicians and scientific workers of comparable status residing in countries where there are as yet no national cardiological societies. Non-members will be permitted to attend the Scientific Sessions by special invitation. Those desiring to present papers at the Scientific Sessions must submit titles of papers with abstracts of not over 200 words in English, French and Spanish (and if desired, also in one other language) to the secretaries of their national cardiological societies. These officers will forward to the Secretary-General only those papers which have been approved by the executive committee of each

national society. L. W. Gorham, M.D., Secretary-General, Second International Congress of Cardiology, 44 East 23rd Street, New York 10, N.Y. Both abstracts and translations must be submitted in duplicate, typed double-spaced, with wide margins, and on one side of the sheet only. All titles and abstracts must arrive in the United States on or before February 1, 1954. Final selection will be made by the Program Committee on the basis of providing a well-co-ordinated, balanced program. It is planned to have members from abroad present nearly all of the papers at the Congress, while members from U.S. will make their presentations chiefly at the Scientific Sessions of the American Heart Association which will be held in Washington immediately after the Congress, on September 16 through 18, 1954. Registration fees for the Congress will be: Members, \$25.00; Associate Members (wives and children) \$10.00 per person, payable in dollars or draft on U.S. banks.

## SYMPOSIUM ON VIRUS INFECTION

An international symposium on virus infection will be held at the Henry Ford Hospital in Detroit, Mich., on October 21 to 23, 1953, anyone interested is welcome to attend this symposium, according to word received from Dr. E. L. Quinn, Secretary of the Program Committee.

A number of internationally known experts in their respective fields will participate. Fields to be covered are as follows:

1. Mechanisms of Virus and Rickettsial infections. Moderators are Dr. T. M. Rivers of the Rockefeller Institute for Medical Research, and Dr. J. G. Kidd, Cornell University Medical College.
2. Ecology and Pathogenesis. Moderator Dr. A. E. Sabin, University of Cincinnati.
3. Mechanisms of Immunity. Moderator Dr. J. Paul, Yale University School of Medicine.
4. Methods of Virus and Rickettsial Diagnosis. Moderator Dr. A. J. Rhodes, The Hospital for Sick Children, Toronto.
5. Chemical Approaches to Prophylaxis and Therapy of Virus and Rickettsial Diseases, Moderator Dr. G. Dall-dorf, N.Y. Department of Health.

## CANCER CONTROL

Today, nearly two out of every three persons—65%—believe cancer is curable if caught in time, compared with 56% 13 years ago. This was ascertained by a poll taken recently by the American Institute of Public Opinion at the suggestion of the American Cancer Society. Survey evidence also indicates that more than half of all those questioned—54%—today are able to name one or more cancer symptoms. Only 38% could do so when the first survey was made.

## LIFE EXPECTANCY

The average lifetime of the American people reached a new high of 68.4 years in 1950, according to the Metropolitan Life Insurance Company's statisticians. This represents a gain of 21 years since 1900; during the prior half century—from 1850 to 1900—the increase was only 7 years. As a result of the increase in longevity since the start of this century, the average American who now reaches age 25 has as many years of life before him as did the average newly born baby of 1900.

The gain in expectation of life since the turn of the century is attributed by the statisticians to "striking advances in the medical and allied sciences, the greater number and wider activities of public and voluntary health agencies, and the rapid rise in the standard of living." Women have not only had a longer average life time than men during the past half century, but they have also made the more rapid gains in longevity. In 1950 the expectation of life at birth for white females was 72.4, as compared with 66.6 years for white males, a difference of nearly six years.

*(Continued on page 80 of the advertising section)*

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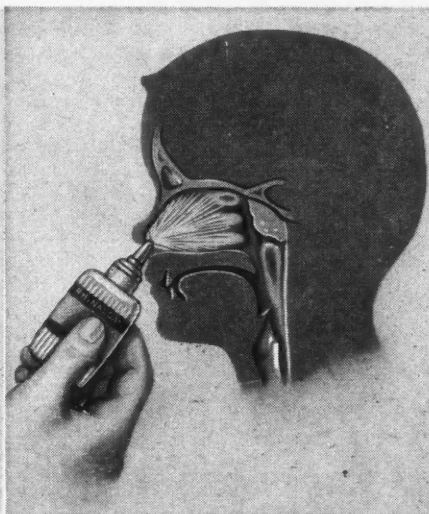
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w/v in an isotonic aqueous solution with 0.02%  
Laurylammonium saccharin. Flavored. pH 6.4.

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#### Reference to RHINALGAN:

1. Van Alyea, O. E., and Donnelly, W. A.: E.E.N.&T. Monthly, 31, Nov. 1952.
2. Fox, S. L.: AMA Arch. Otolaryn., 53, 607-609, 1951.
3. Molomut, N., and Harber, A.: N.Y. Phys., 34, 14-18, 1950.
4. Lett, J. E., (Lt. Col. MC-USAF) Research Report, Dept. Otolaryn., USAF School Aviat. Med., 1952.
5. Hamilton, W. F., and Turnbull, F. M.: J. Amer. Pharm. Ass'n., 7, 378-382, 1950.
6. Browd, Victor L.: Rehabilitation of Hearing, 1950.
7. Kugelmass, I. Newton: Handbook of the Common Acute Infectious Diseases, 1949.

NEW O TOS-MO-SAN—A specific in Suppurative Ear Infections (Acute or Chronic).

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## NEWS AND NOTES

(Continued from page 78 of the advertising section)

## NEW JOURNAL ON CANCER

With the aid of grants authorized by the National Cancer Institute of the Public Health Service and the American Cancer Society Inc., *Excerpta Medica* has issued in July of this year the first number of the first volume of its new abstract journal covering the field of cancer and its related fields.

The new Cancer Section, like the existing fifteen sections, will be published monthly. It will contain 700 to 800 pages of informative abstracts a year including a monthly index of authors. It will also have a classified subject and authors index in completion of each yearly volume. Further information is available from *Excerpta Medica*, 111 Kalverstraat, Amsterdam-C, Holland.

## CIVIL DEFENCE

To impress on Canadians the importance of preparedness in peace and war, a large civil defence convoy will travel from coast to coast and back this Fall, staging civil defence shows in key cities. Bearing the slogan "On Guard, Canada" the convoy and shows will constitute the most extensive public information project yet undertaken to alert the country and to develop general awareness of Canada's civil defence program.

Seven huge tractor-trailers, and accompanying vehicles, including a three-ton truck bearing a self-contained power plant and station wagons for personnel and accessories, will make up a colourful fleet which is to cover more than 10,000 miles, most of it via the Trans-Canada Highway. In its tour from Halifax to Vancouver, the convoy will set up exhibitions of civil defence display materials which the tractor-trailers will carry. Arrival of the convoy will be the occasion for special civil defence exercises in those cities, with municipal and provincial civil defence organizations co-operating.

## BCG STUDIES

Four large-scale studies of BCG undertaken by the U.S. Public Health Service do not indicate that tuberculosis in this country would be more effectively controlled by adding mass vaccination programs, according to Dr. Carroll E. Palmer and Lawrence W. Shaw of the Division of Chronic Disease and Tuberculosis, PHS. All of the PHS studies were control studies, with approximately the same number of persons within the group not vaccinated as were vaccinated following a tuberculin test to determine whether tuberculous infection was present. Only non-reactors were vaccinated and used for controls, but reactors were followed up with the vaccinated and control groups.

The first study was set up in 1947 among school children in Muscogee County, Ga. This was later (1950) extended to include the general population. Another study, started in 1949 in co-operation with the Bureau of Indian Affairs, was among 27,000 Indian school children, where the prevalence of tuberculosis is high. The third study was inaugurated in 1948 among 20,000 Ohio mental patients, among whom 14,800 reacted to tuberculin. In 1950 a study was started among Puerto Rican children.

Follow-up groups has revealed, according to the authors, that a very large part of the tuberculosis in the group has occurred among the tuberculin reactors, that is, among those who were already infected and were not eligible for vaccination. Little tuberculosis has appeared in those eligible for vaccination, they point out, whether or not they had been vaccinated. The second major point the study brings out is that the number of cases and deaths among those eligible for vaccination, whether or not they were vaccinated, is still too small to provide any definite evidence on the effectiveness of BCG. The third point is that these studies do not indicate, that

tuberculosis in this country would be more effectively controlled by adding mass vaccination programs. Muscogee County in Georgia may not be entirely representative of the whole country but, since the effect of the vaccination program there is imperceptible, it seems that there is little reason to expect very different results in other communities.

AWARD FOR OUTSTANDING RESEARCH  
IN THE FIELD OF INFERTILITY

The American Society for the Study of Sterility announces the opening of the 1954 contest for the most outstanding contribution to the subject of infertility and sterility. The winner will receive a cash award of one thousand dollars, and the essay will appear on the program of the 1954 meeting of the Society. Essays submitted in this competition must be received not later than March 1, 1954. For full particulars concerning requirements of this competition, address The American Society for the Study of Sterility, c/o Dr. Herbert H. Thomas, Secretary, 920 South 19th Street, Birmingham, Alabama. The author should append on a separate sheet of paper a short biographical sketch of himself and include a photograph to be used in the necessary publicity should he be the winner of the award.

THE NATIONAL SOCIETY FOR  
CRIPPLED CHILDREN AND ADULTS

The 1953 annual convention of the National Society for Crippled Children and Adults will be held on Nov. 12-14 at Chicago's Palmer House. In addition to other outstanding speakers, the convention program will include general sessions, seminars, exhibits, demonstrations, workshops, social events and other features packed with information and inspiration to appeal to all rehabilitation workers, volunteers and parents of crippled children who will attend the convention from across the nation.

Architecture and its adaptations to meet the needs of the crippled will be featured for the first time at this year's three-day meeting. A forum on architectural planning for public buildings, schools and hospitals will be included. A special architectural exhibit will contain a model rehabilitation centre.

## NTA RESEARCH

Since the U.S. National Tuberculosis Association inaugurated its program of grants to aid medical research 32 years ago, approximately 700 original scientific articles have been published by investigators receiving grants. This was brought out by Dr. Karl F. Meyer of San Francisco, chairman of the Committee on Medical Research of the NTA's medical section, the American Trudeau Society, in his annual report. Ever since 1921, those who have guided the research programs of the National Tuberculosis Association have realized that the most important scientific achievements are the fruits of the intellectual adventures of individuals and small groups of scientists in a wide variety of settings. A budget of \$190,126 for the current year provided for 37 grants. The subjects of study fall almost equally into two groups, with 18 dealing with the parasite (tubercle bacillus) and 19 with the host. This seems natural since a tuberculosis infection is biologically a host-parasite relationship.

The annual joint sessions of investigators receiving grants, have stimulated a unique type of discussion of common and related problems that has vitality and vigor, not possible in more formal programmed meetings. It is in this type of conclave that controversial subjects are thoroughly reviewed and subjected to searching appraisal. Not infrequently it is in such exchanges it is realized that ideas considered to be facts cannot be confirmed on account of the diversity, or more frequently the limitations, of the techniques employed. The thoughts expressed are penetrating, analytical and productive, the spirit is co-operative and cordial. This is often the birthplace of new subjects for research.

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### Books Received

**Handbook of Treatment of Acute Poisoning.** E. H. Bensley, Director, Department of Metabolism and Toxicology, The Montreal General Hospital; and G. E. Joron, Junior Assistant, Department of Medicine and Department of Metabolism and Toxicology, The Montreal General Hospital. 201 pp. \$2.50. Renouf Publishing Co., Ltd., Montreal, P.Q., 1953.

**Medicine.** Edited by H. G. Garland, Physician in charge, Department of Neurology, General Infirmary at Leeds; and W. Phillips, Senior Physician in charge of Cardiac Department, Cardiff Royal Infirmary. Volume I and II, 2146 pp., illust. \$23.00 per set of two volumes. The Macmillan Co. of Canada Ltd., Toronto, 1953.

**Expert Committee on Influenza.** World Health Organization: Technical Report Series, No. 64. 32 pp. Price \$0.20, 1/6, Fr. fr. 0.65, Sw. fr. 0.80. Available also in French edition. World Health Organization, Palais des Nations, Geneva, April, 1953.

**The Course of Disseminated Sclerosis.** P. Thygesen. 268 pp., illust. Rosenkilde & Bagger, Copenhagen, 1953.

**The Canada Year Book 1952-53.** The official statistical annual of the resources, history, institutions, and social and economic conditions of Canada. Published by authority of The Right Honourable C. D. Howe, Minister of Trade and Commerce. 1266 pp. \$3.00. Queen's Printer and Controller of Stationery, Ottawa, 1953.

**Clinical Endocrinology.** L. M. Hurxthal, Head of the Department of Internal Medicine, Lahey Clinic, Boston; and N. Musulin, Staff of Cooper Hospital, Camden, N.J. Volume I and II, 1599 pp., illust. \$24.00. J. B. Lippincott Co., Montreal, 1953.

**Histology.** A. W. Ham, Professor of Anatomy, in Charge of Histology, in the Faculties of Medicine and Dentistry, University of Toronto, Toronto. 866 pp., illust. Second Edition. \$10.00. J. B. Lippincott Co., Montreal, 1953.

**Medical History of the Second World War. Army Medical Services.** F. A. E. Crew. Volume I, 530 pp., illust. Price 50s. Her Majesty's Stationery Office, London, 1953.

**Lind's Treatise on Scurvy.** Edited by C. P. Stewart and D. Guthrie. 440 pp., illust. Price 45/- net. Edinburgh University Press, Edinburgh, 1953.

**Expert Committee on Venereal Infections and Treponematoses.** World Health Organization: Technical Report Series No. 63. 84 pp., illust. Price: 4/3, \$0.55, Fr. fr. 175.-, Sw. fr. 2.20, available also in French edition. World Health Organization, Palais des Nations, Geneva, May, 1953.

**First International Symposium on Yaws Control.** World Health Organization: Monograph Series No. 15. 418 pp., illust. Price: 22/6, \$4.50, Fr. fr. 1,440.-, Sw. fr. 18.-, Mixed language edition—English and French. World Health Organization, Palais des Nations, Geneva, 1953.

**The Work of WHO 1952.** Official Records of the World Health Organization No. 45. 204 pp., illust. Price: 9/-, \$1.25, Fr. fr. 400.-, Sw. fr. 5.-, available also in French edition. World Health Organization, Palais des Nations, Geneva, March, 1953.

**The Pluripotency of the Hypophyseal Hormones.** J. Samuels, Specialist for endogenous endocrinotherapy, Director of the central institution for the Samuels-Therapy, Amsterdam. 296 pp., illust. Price: 37 guilders. Ed. N. V. Cyclocoop, Amsterdam, The Netherlands, 1953.

**Pulmonary Tuberculosis.** R. Y. Keers, Medical Director, Red Cross Sanatoria of Scotland; and B. G. Rigden, Physician, Lewes Chest Clinic. 324 pp., illust., 3rd ed. \$4.10. E. & S. Livingstone, Edinburgh; The Macmillan Co. of Canada Ltd., Toronto, 1953.

**The Physician in Atomic Defense.** T. P. Sears, Associate Clinical Professor of Medicine, University of Colorado School of Medicine; Chief of Medical Service, Veterans Administration Hospital, Denver. 308 pp., illust. \$6.00. The Year Book Publishers Inc., Chicago, Ill.; Burns & MacEachern, Toronto 2, 1953.

**Your Diabetes and How to Live with it.** F. L. Rogers, and R. M. Leverton. 113 pp. \$2.75. University of Nebraska Press; Burns & MacEachern, Toronto 2, 1953.

**Annual Review of Medicine.** Edited by W. C. Cutting, Editor, Stanford University School of Medicine, and H. W. Newman, Associate Editor, Stanford University School of Medicine. Volume 4. 452 pp. \$6.00. Annual Reviews, Inc., Stanford, California, U.S.A., 1953.

**The 1952 Year Book of Endocrinology.** Edited by G. S. Gordan, Assistant Professor of Medicine, University of California School of Medicine; Assistant Physician, University of California Hospital. 400 pp., illust. \$5.50. The Year Book Publishers, Inc., Chicago, Ill., 1953.